

William Blair

July 2022

The Quarterly Rx: Q2 2022 U.S. Biopharma Recap



Q2 2022 Biopharma Market Summary – Key Takeaways

Biopharma companies continue to weather the storm amid one of the worst sector downturns in the last 25 years; focus remains on cash runway, quality news flow/data, and consolidation



Biopharma Bear Market

- Inflation, monetary policy, geopolitical tensions, and COVID-related supply chain disruptions remain key headline risks
- **The biopharma sector continues to be further weighed down by a string of negative/mixed clinical readouts**, broad financing overhang, and limited meaningful M&A
- **Russell 2000 rebalance at the end of June viewed as a clearing technical event** for the biopharma sector



(Not So) Easy as A-B-IPO

- Biopharma IPO market slows even further compared to last quarter, with only **3 offerings priced in Q2 2022** raising a total of \$374 million; slowdown also felt in private financing market as only 12 crossover deals announced in Q2 2022 compared with 24 in the year-ago period
- **Several companies that had raised Series A/B crossover financings in 2021 with the aim of going public this year are now raising new private rounds or conducting bridge extensions as they wait for IPO market to improve**
- Increased focus on reverse mergers and SPACs as alternatives to IPO, however high level of competition for quality shells/SPACs, especially given growing interest in public mergers with public shells for cash



Everything Old is New Again

- While still below 2021 levels, overall secondary activity has ticked up buoyed by an **increase in investor-led PIPEs and Registered Directs** (37 offerings priced in Q2 2022 compared with 18 in the prior quarter)
- **Majority of secondary offerings are being driven by clinical catalysts** (62%) while addressing financing overhang (38% with less than one year of cash at time of financing) has accounted for the balance
- Given dislocation in public market valuations (194 companies trading at or below cash as of June 30, 2022), **institutional investors and VC/PE funds have increased their focus on public opportunities**



Cash is King

- **H1 2022 headlines dominated by corporate restructurings** with 26 biopharma companies in Q2 2022 alone announcing layoffs, resulting in a median reduction in workforce of 34% and cash runway extension of 2 quarters
- Of the 146 companies with that had less than 1 year of cash as of December 31, 2021, 52% have extended their cash runway either through capital raises, strategic partnerships or corporate restructuring
- **Smaller-cap biopharma have faced more pronounced financing overhangs and experienced greater deterioration in valuation** as investors are unwilling to invest in the open market ahead of potential financings



Hitting Their Targets... ...Without Reward?

- Investors not being rewarded for taking clinical risk, with median 1-day performance for "positive" catalysts flat in Q2 2022
- **~20% of "positive" clinical catalysts experienced greater than 20% one-day stock-price appreciation**; more than half of companies that released negative clinical data lost nearly 40% of market cap
- Increasing number of companies utilizing a wall-cross and providing selected investors an early look at data to catalyze a financing and then subsequently announcing the data and financing concurrently to the market, given overall muted stock price reactions and higher scrutiny of data



This Isn't the M&A Investors are Looking for (yet)

- **~30% increase in early-stage collaborations** in H1 2022 (vs. H1 2021), which we expect to continue in turbulent market backdrop, providing platform validation and non-dilutive capital
- **Momentum in M&A activity increases** with 18 public and private biopharma acquisitions announced in Q2 2022
- While most transactions were relatively small, Biohaven's acquisition by Pfizer, Turning Point's acquisition by Bristol Myers Squibb, and Seagen's rumored acquisition by Merck at the end of June, have rekindled investor enthusiasm

What We Are Hearing – Investor Sentiment and Outlook

As market downturn persists, institutional investors increase focus on cash runway and clinical milestones; dislocation in public market valuations begin to shake up private financings

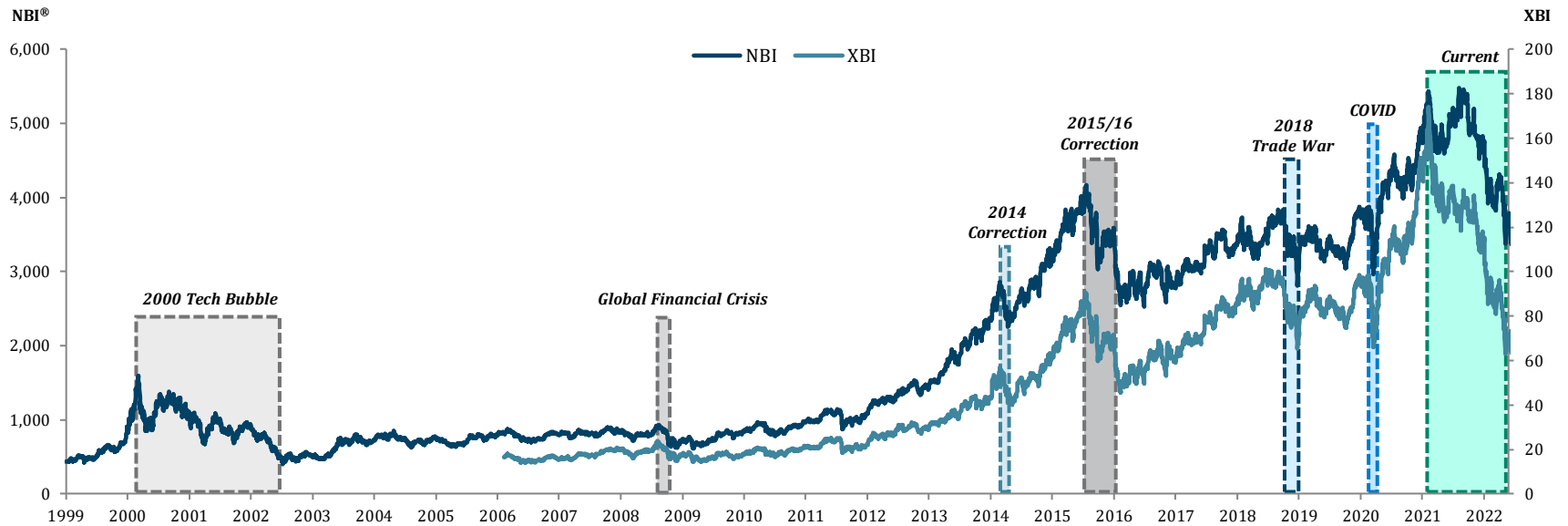
Curiosity Corner: Data vs Structure?
“Big preference for MNPI vs structure... information matters a lot more than terms to get over the line” – West Coast Healthcare VC
“Structure is great, but ultimately information edge trumps all” – New York Hedge Fund

<p>Overall Market</p>		<ul style="list-style-type: none"> • Broader macroeconomic themes remain in the crosshairs; focus remains on higher quality names with strong balance sheets. Several investors have moved to “de-risk” their portfolios by moving upstream in market cap (i.e., from small/mid-cap to mid/large-cap) • “Biotech is hard enough, compounding macro risk on top is too hard” – West Coast Biopharma Fund
<p>Biopharma Market</p>		<ul style="list-style-type: none"> • Increased focus from investors on prioritizing highest conviction programs (i.e., becoming more asset-centric even with platform companies) given crunch on capital supply in order to get to meaningful valuation inflection points • Russell 2000 rebalance viewed as a potential technical clearing factor for the sector; speculation on magnitude of weighting change was an overhang during H1 2022 • “We really need to see a string of real clinical wins before I have any conviction in a biotech bounce” – New York Hedge Fund
<p>2022 Outlook</p>		<ul style="list-style-type: none"> • Overall sentiment is that financings over the next 12 months will remain challenging; valuation will remain squarely in focus while companies will continue evaluating alternative financings to extend runway • While biopharma lags the broader market, biopharma dedicated funds have experienced over \$5 billion in inflows H1 2022; convergence of PE/VC given recent fund acquisitions also viewed as providing boost to capital supply ecosystem • “Feels like we’re near the bottom in terms of sentiment but it will likely not be a swift recovery like in 2020” – SMID-Cap Generalist PM
<p>Private Financings</p>		<ul style="list-style-type: none"> • Most investors surveyed continue to be highly selective in their private investments; several highlighted elevated levels of redundancy in private companies stressing the need to show true differentiation while others emphasized rewarding capital efficiency in private companies • With path to near-term liquidity uncertain given disrupted IPO market, investor participation has concentrated amongst life science specialists and later-stage VC funds • Deterioration in public market benchmarks has impacted private valuation expectations; “flat is the new up” • “I don’t think the world needs dozens of biotechs chasing the same targets right now; we’re looking for truly differentiated assets that are unique” – Boston Biopharma VC
<p>IPOs</p>		<ul style="list-style-type: none"> • Biopharma IPO market remains open for high quality, best-of-breed companies able to leverage outsized support at launch from their existing investor syndicate • Weak aftermarket performance for Class of 2020-2022 biopharma IPOs has dampened broad investor participation • “I don’t feel compelled to buy in the IPO right now because it’s become so easy for me to sit on the sidelines and wait for better opportunities to buy later” – Midwest Long-only Asset Manager
<p>Follow-Ons & PIPEs</p>	 <p>Weak ↔ Strong</p>	<ul style="list-style-type: none"> • Investors are cautiously (but increasingly) deploying capital into high conviction public opportunities; strong bias from investors to “overfund” companies 12-18 months beyond next key inflection point • Increase in PIPE and Registered Direct financings being driven by life science specialist and VC funds leveraging MNPI • “Surprised more companies haven’t raised yet; increased dilution now is short term pain for hopefully long-term gain” – Boston Biopharma Fund

Biopharma Performance During Market Downturns

Current market downturn in the Nasdaq Biotechnology Index® has eclipsed the length seen in the 2015/2016 correction, although has not been as deep; longest downturn on record for the XBI

Performance Since 1999



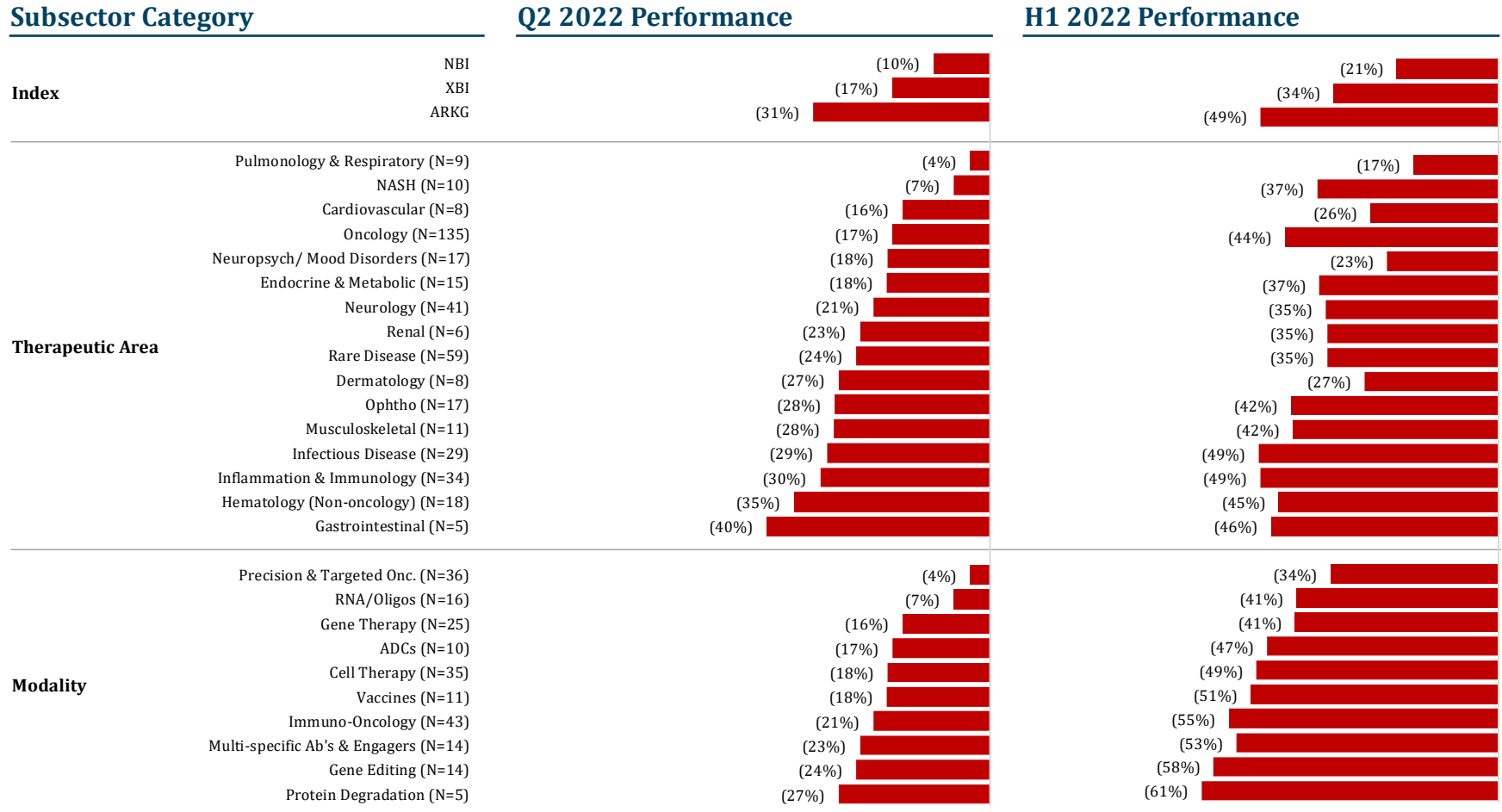
Time Period	NBI®				XBI			
	Peak to Trough		Recovery ⁽¹⁾ to % of Prior Peak		Peak to Trough		Recovery ⁽¹⁾ to % of Prior Peak	
	% Change	Duration ⁽¹⁾	90%	100%	% Change	Duration ⁽¹⁾	90%	100%
2000 Tech Bubble	(74.7%)	28.5	123.6	129.7				
Global Financial Crisis	(33.1%)	3.3	9.9	15.8	(35.5%)	3.3	25.2	29.1
2014 Correction	(21.1%)	1.6	1.8	4.5	(29.2%)	2.3	1.8	5.8
2015/2016 Correction	(38.7%)	6.9	29.8	51.7	(49.4%)	7.0	17.6	23.7
2018 Trade War	(26.7%)	3.8	0.8	12.1	(35.3%)	6.2	2.2	16.8
2020 Covid	(23.7%)	0.9	0.7	1.1	(32.9%)	0.9	1.1	1.8
Current	(38.5%)	10.3			(63.9%)	15.2		

(1) In Months.

Source: FactSet as of June 30, 2022. NBI® = Nasdaq Biotechnology Index, XBI = SPDR S&P Biotech.

NBI® Subsector Market Performance

In Q2 2022, every therapeutic area / modality has seen negative performance with hematology (non-oncology) and gastrointestinal representing the two biggest laggards, while targeted oncology and RNA-targeted therapeutics have fared better than other modalities in Q2 2022

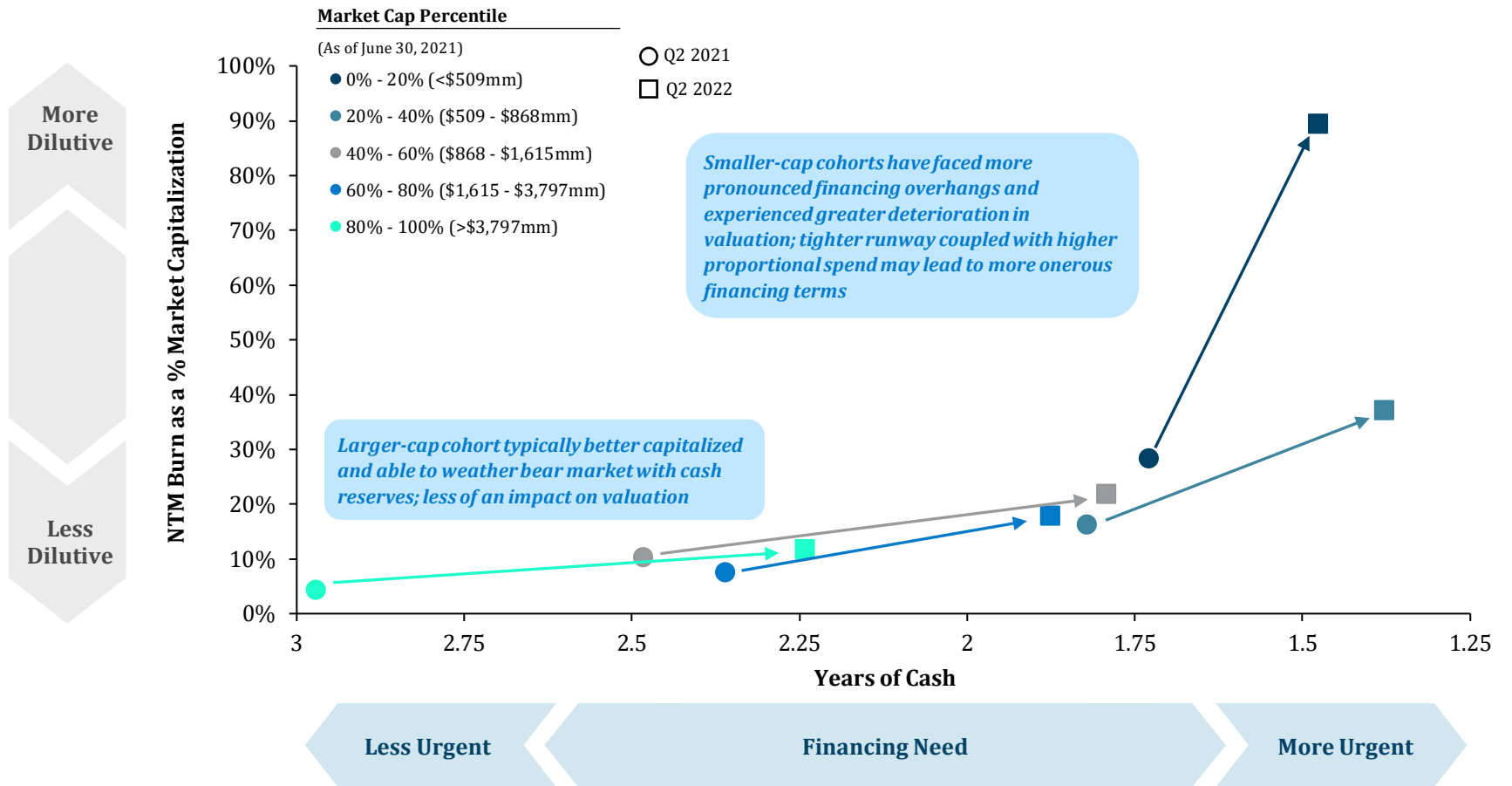


Note: Subsector indices are equally weighted. ARKG = ARK Genomic Revolution ETF.
 Source: FactSet, CapIQ and William Blair internal reporting. Q2 2022 and H1 2022 performance as of June 30, 2022.

The Haves and the Have Nots; Large-Caps Have Fared Better

A crunch on supply of financing capital has created a wide division between large-caps and small-caps. If market downturn continues, large-caps may also begin to experience more pronounced financing overhang

NBI® Financing Ability by Percentile



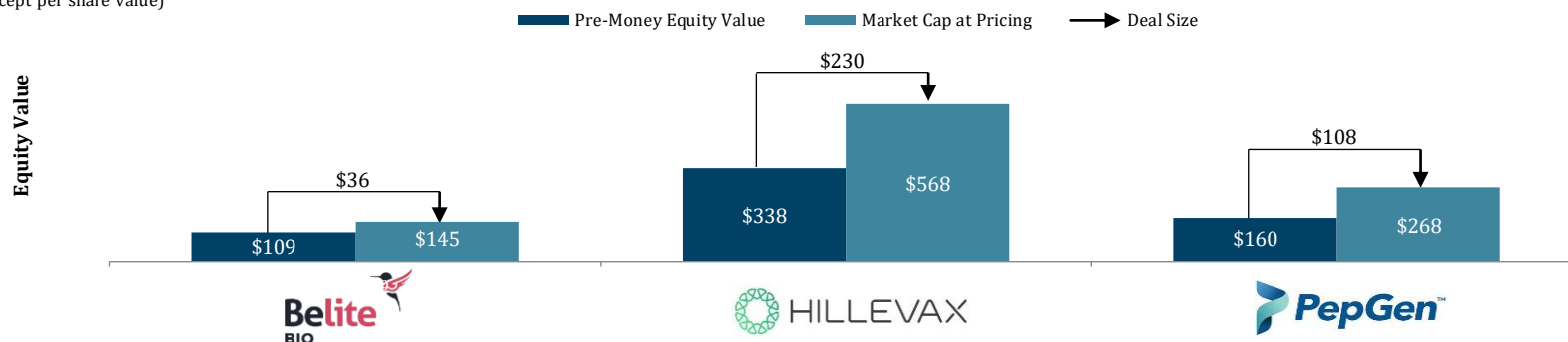
Note: Excludes cash flow positive constituents.
Source: CapIQ and Factset as of June 30, 2022.

Q2 2022 Biopharma IPOs

The biopharma IPO market largely remained closed, as Q2 2022 saw the lowest volume of any quarter since Q1 2017

Q2 2022 IPO Activity Detail

(\$ in millions, except per share value)



Deal Overview At Pricing

Pricing Date	4/28/22	4/28/22	5/5/22
Offer Price	\$6.00	\$17.00	\$12.00
Enterprise Value	\$90.2	\$213.7	\$27.5
Step-Up	NA	1.3x	0.8x
Initial File/Offer vs. Range	In Range	In Range	Below
Deal Value as % of Market Value	24.9%	40.5%	40.2%
Key Pre-IPO Investors	Johnson & Johnson Innovation - JLABS	Abingworth, BVF, Catalys Pacific, Deerfield, Franklin Templeton, Frazier Healthcare, Greenspring Associates, Lightspeed Venture, Perceptive Advisors, Qiming Venture	Adage, CureDuchenne Ventures, Deerfield, Gray's Creek, Laurion, Oxford Science Enterprises, Qatar Investment Authority, RA Capital Management, Samsara, Tudor Investment
Insider Shadow Book at Launch	ND	100%	100%
Allocation to New Investors	ND	15%	15%

Post-IPO Performance

Offer/1 Day	+76.5%	+12.3%	+7.4%
Offer/30 Day	+142.2%	(43.6%)	(11.8%)
Offer/Current	+419.0%	(35.7%)	(17.3%)

Lead Asset at Pricing

Name	Tinlarebant	HIL-214	PGN-ED051
Phase	Phase III	Phase II	Phase I
Therapeutic Area	Ophthalmology	Infectious disease	Neurology
Modality	Small molecule	Vaccine	Oligonucleotide
Indication	Autosomal recessive Stargardt disease	Norovirus-related illness	Duchenne muscular dystrophy

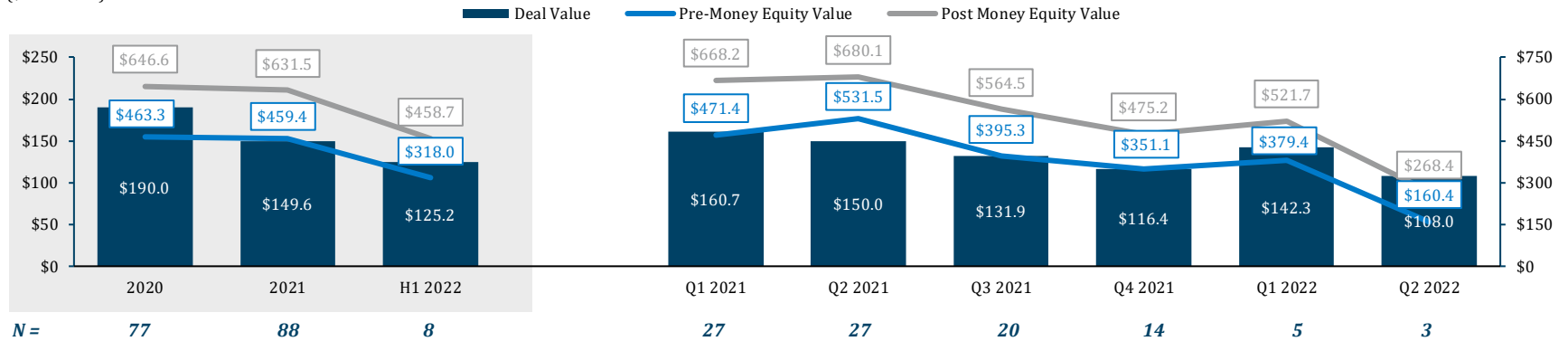
Note: All valuations performed on basic share count basis. Includes U.S. IPOs only. Excludes best efforts IPOs and IPOs less than \$25 million in gross proceeds. Source: CapIQ, Dealogic, FactSet and SEC Filings as of June 30, 2022. ND = Not Disclosed. NA = Not Applicable.

Biopharma IPO Trends

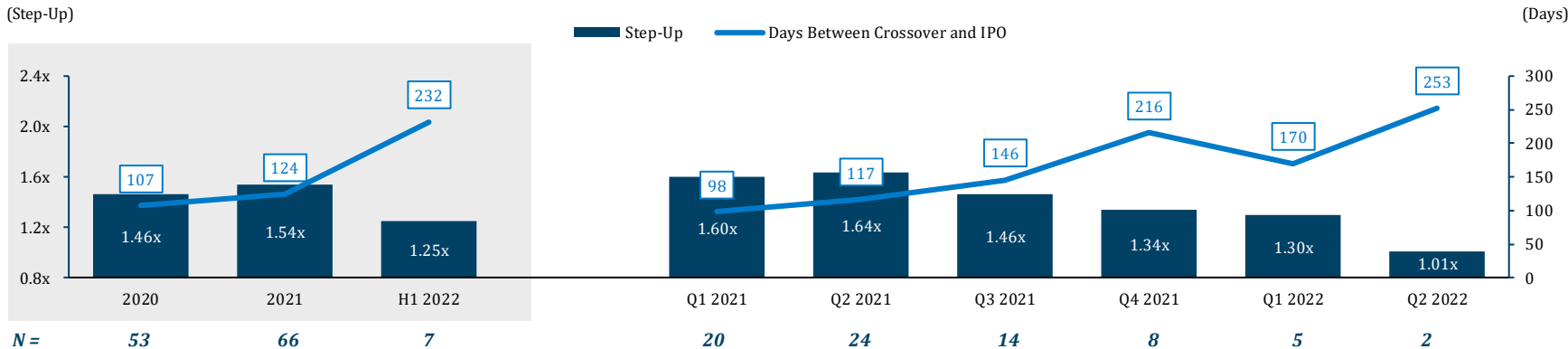
- *Biopharma IPO activity continues to slow significantly in Q2 2022*
- *Step-ups and valuation continue to trend down while days between crossover and IPO has materially increased since last year given market volatility*

Deal Sizing and Valuation

(\$ in millions)



Crossover-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.

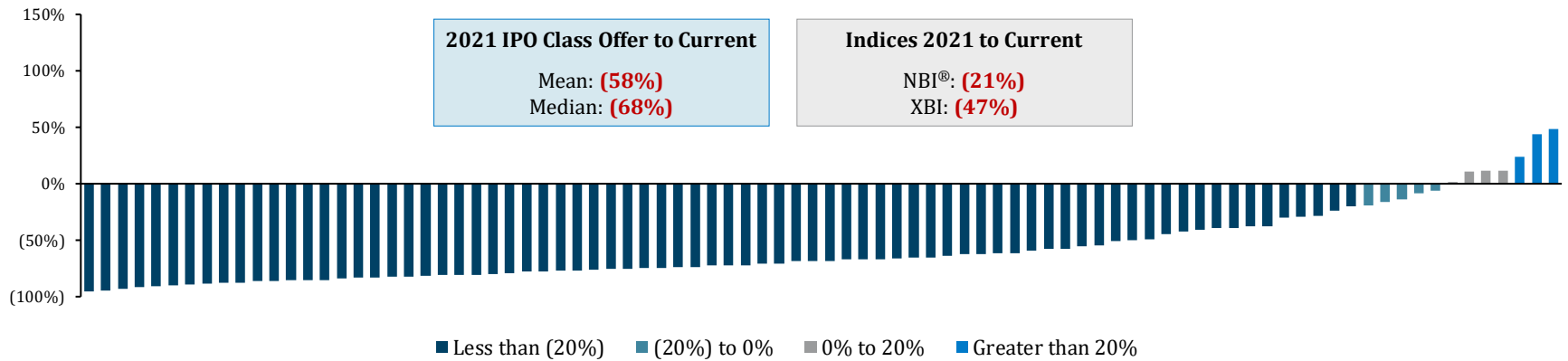
Source: CapIQ, Dealogic, FactSet, and SEC Filings as of June 30, 2022. Note: All valuations performed on basic share count basis.

(1) Crossover rounds defined as pre-IPO financings completed within 365 days of IPO with institutional investor participation.

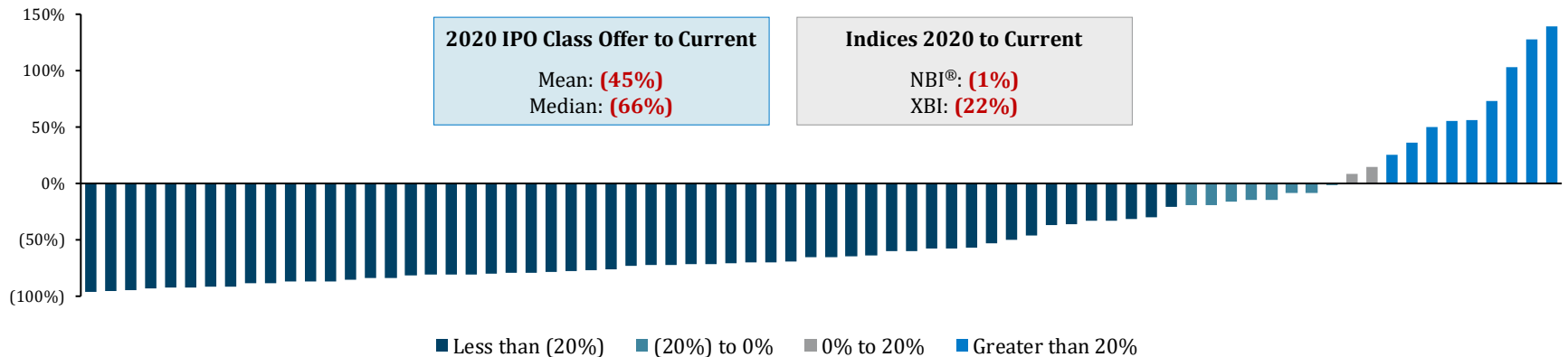
Biopharma IPO Aftermarket Performance for 2020 and 2021 Cohorts

Biopharma IPOs in 2020 and 2021 have underperformed broader biopharma indices, with only 15% (N=11) and 8% (N=7) of IPOs trading above issue price, respectively

2021 Biopharma IPO Class Performance (N=88)



2020 Biopharma IPO Class Performance (N=74)

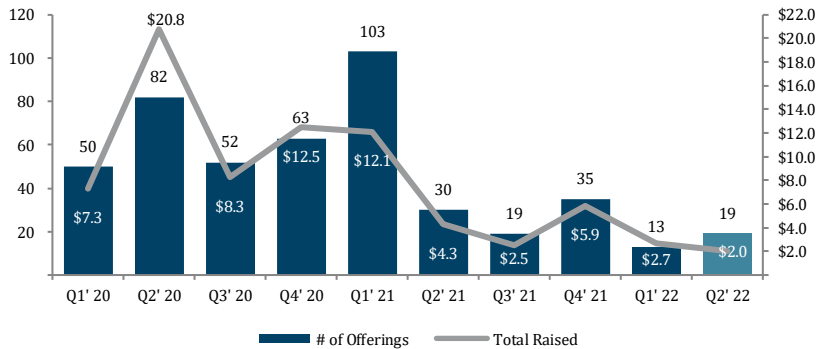


Biopharma Follow-ons Trends

- Public market valuations continue to be under pressure which has extended the slowdown in follow-on activity; catalyst driven offerings made up 13 of the 19 follow-ons in the quarter
- Pricing discounts have tightened relative to Q1 2022, though investors continue to push companies to raise larger amounts of capital relative to market cap in order to de-risk cash runway; increased use of pre-funded warrants in offerings as investors are taking larger ownership percentages in companies

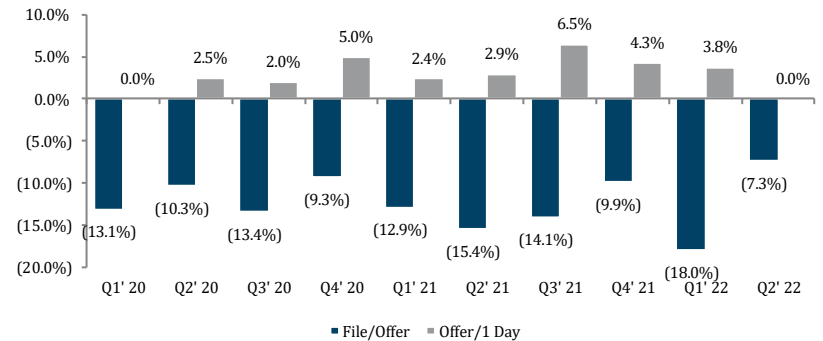
Deal Volume

of Offerings / Total Proceeds Raised (\$ in billions)



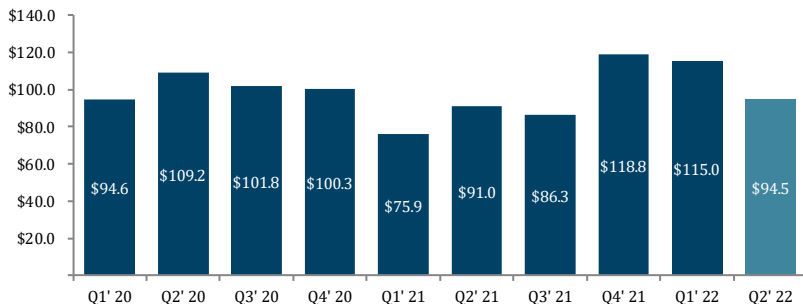
Pricing and Performance

Median



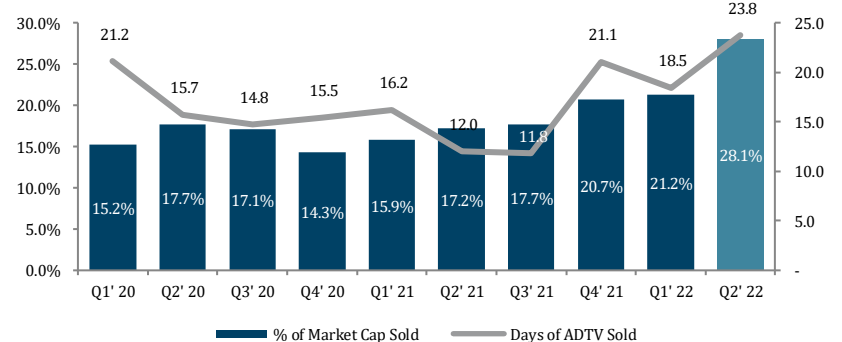
Median Proceeds Raised

(\$ in millions)



Deal Sizing Stats

Days of ADTV measured using 30-day ADTV



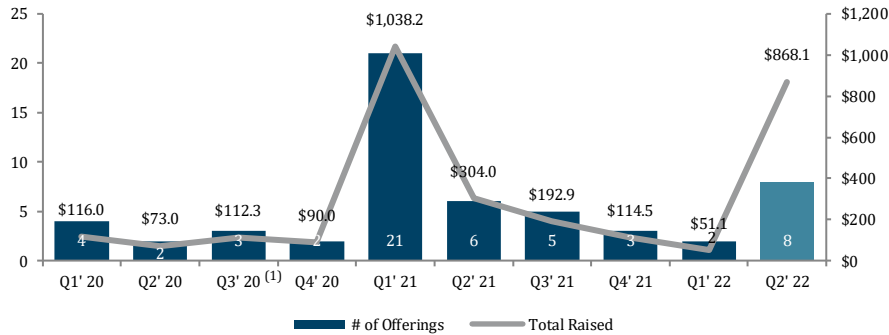
Note: Excludes Registered Directs, PIPES, and offerings with gross proceeds below \$20 million. Median Pricing and Performance includes offerings with warrants.
Source: Dealogic as of June 30, 2022.

Registered Directs and Unregistered PIPEs Trends

- PIPEs and Registered Directs are being increasingly used by issuers as alternative financing vehicles
- Fully confidential process allows for extensive investor due diligence and highly concentrated investor allocations

Registered Directs

of Offerings / Total Proceeds Raised (\$ in millions)

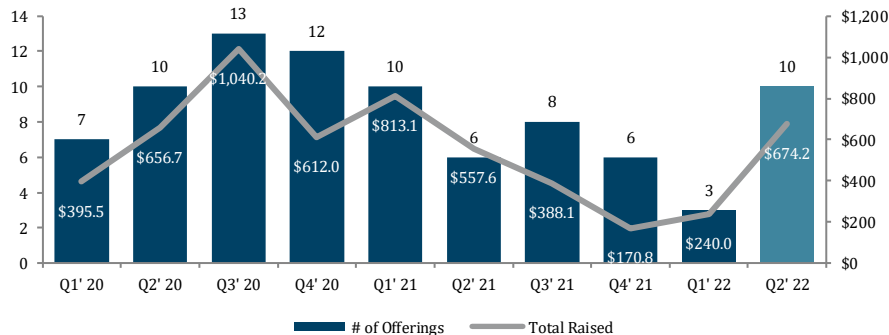


Key Highlights

- Elevated activity with 8 offerings priced in Q2 2022 raising \$868.1 million in gross proceeds vs. 2 in Q1 2022; second most active quarter in the last 10 years
- Activity largely being driven by reverse inquiries and desire to keep allocations highly concentrated amongst smaller investor syndicate
- Discounts have tightened compared to 2021 with a median pricing at last trade and 1-day performance has remained in line
- Warrant coverage has decreased significantly in 2022 (only 1 offering) vs. 37% in 2021

Unregistered PIPEs

of Offerings / Total Proceeds Raised (\$ in millions)



Key Highlights

- PIPE activity was elevated compared to Q1 2022 with 10 offerings raising \$674.2 million in gross proceeds
- Given most offerings are exceeding the 20% Nasdaq threshold, majority are being priced at market (0% discount) compared to a median discount of 8.5% in 2021
- While warrant coverage has increased to a median 87.5%, the % of offerings with warrants is 40% in line with 2021
- 83% of opportunistic offerings in Q2 2022 had less than 1 year of cash

Note: Excludes strategic transactions and transactions with gross proceeds under \$20.0 million.

Source: Dealogic, Company press releases, and Factset as of June 30, 2022.

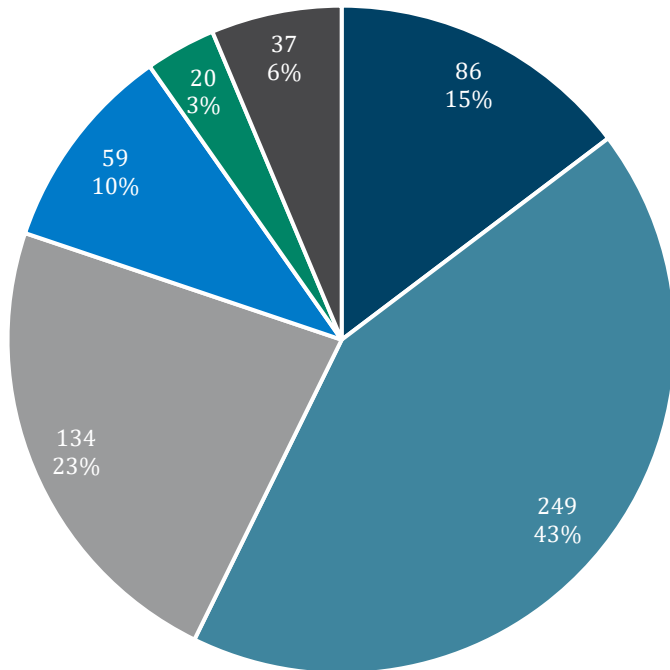
(1) Excludes BeiGene's \$2.1 billion RD on July 12, 2020.

Meaningful Financing Overhang in the Public Biopharma Market

- Nearly 60% of US-listed SMID-cap biopharma companies have less than two years of cash
- Public market valuations and cash needs creating significant competition for IPO asset class
- ~\$35 billion⁽¹⁾ needs to be raised to provide companies with less than two years of cash additional 12 months of runway

Over 300 Companies Have Less Than 2 Years of Runway

Includes biopharma companies listed on major U.S. exchanges with market capitalization between \$25 million and \$10 billion (N=585)

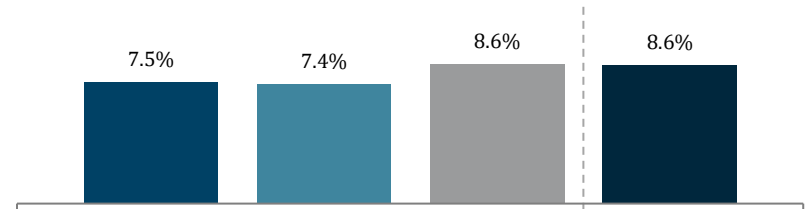


■ <1 Year ■ 1-2 Years ■ 2-3 Years ■ 3-5 Years ■ 5+ Years ■ Profitable

SMID-Cap Company Stock Price Performance Exacerbated by Near Term Financing Needs

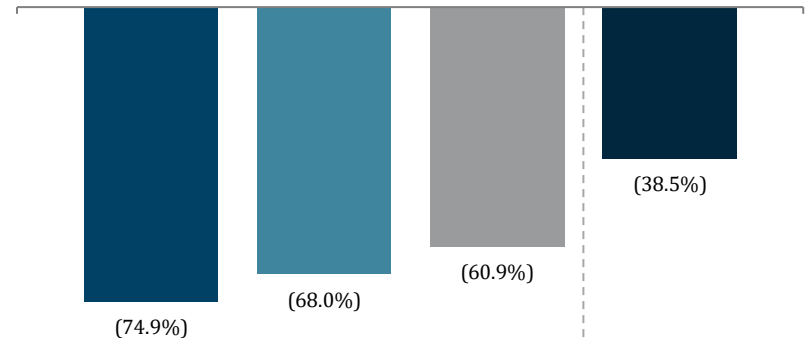
Short Interest is Relatively In-line Across Cash Positions...

Short Interest as a % of Float



... but Companies with Near-Term Financing Overhang have Underperformed LTM

Median LTM Stock Performance



■ <1 Year ■ 1-2 Years ■ 2-3 Years ■ 3+ Years⁽²⁾

Note: Includes biopharma companies listed on major U.S. exchanges with market capitalization between \$25 million and \$10 billion with available consensus estimates.

Source: FactSet and William Blair internal analysis as of June 30, 2022.

(1) Based on NTM EBIT estimates.

(2) Includes companies with 3+ years of cash or profitable companies.

Focus on Cash Preservation Has Driven Increase in Corporate Restructurings

26 biopharma companies announced corporate restructurings in Q2 2022, resulting in a median 34% reduction in their workforce and a median cash runway extension of two quarters

(\$ in millions)

Date of Announcement	Company	Market Cap Prior to Announcement	Cash Balance at Announcement	<1 Year of Cash Prior to Announcement	<1 Year of Cash Post-Announcement	Workforce Reduction	Runway Extension in Quarters ⁽¹⁾
6/30/2022	Heron Therapeutics	\$324.9	\$111.9	✓	✓	34%	1
6/29/2022	Avadel Pharmaceuticals	\$138.1	\$123.5	✓	✗	50%	2
6/28/2022	Oyster Point Pharma	\$134.1	\$143.4	✓	✗	17%	2
6/27/2022	Generation Bio	\$399.6	\$337.0	✗	✗	ND	4
6/22/2022	Zynerba Pharmaceuticals	\$45.5	\$69.7	✗	✗	ND	2
6/6/2022	Vincerox	\$38.1	\$96.5	✗	✗	33%	4
6/6/2022	Praxis	\$383.7	\$222.5	✗	✗	ND	2
6/6/2022	Amarin	\$667.0	\$362.6	✗	✗	40%	NA
6/3/2022	Athersys	\$58.0	\$21.8	✓	✓	70%	2
6/2/2022	Atreca	\$61.4	\$117.9	✓	✗	25%	2
5/18/2022	Applied Molecular Transport	\$165.1	\$126.5	✓	✗	40%	3
5/16/2022	Scholar Rock	\$197.0	\$210.2	✓	✗	25%	2
5/16/2022	Agius Pharmaceuticals	\$1,211.9	\$923.5	✗	✗	50%	NA
5/5/2022	Avalo Therapeutics	\$44.4	\$38.5	✓	✓	33%	1
5/5/2022	BridgeBio	\$1,267.2	\$671.2	✓	✗	ND	4
5/2/2022	Spero Therapeutics	\$159.2	\$122.0	✓	✗	75%	4
5/14/2022	Genocea Biosciences ⁽²⁾	\$13.2	\$20.1	✓	✓	65%	NA
4/27/2022	Solid Biosciences	\$85.6	\$180.1	✗	✗	30%	3
4/25/2022	Nektar Therapeutics	\$849.4	\$667.0	✗	✗	70%	2
4/24/2022	Black Diamond Therapeutics	\$98.7	\$179.7	✗	✗	30%	2
4/18/2022	Imara	\$27.3	\$72.9	✓	✗	83%	2
4/18/2022	Finch Therapeutics	\$193.9	\$106.9	✗	✗	20%	3
4/13/2022	Magenta Therapeutics	\$136.5	\$156.6	✗	✗	14%	2
4/12/2022	ProQR Therapeutics	\$66.3	\$186.2	✗	✗	30%	2
4/4/2022	Bluebird bio	\$354.3	\$211.6	✓	✓	30%	1
4/3/2022	Akebia Therapeutics	\$121.0	\$174.6	✓	✗	42%	3
All (N = 26)				% <1 Year of Cash			
Mean		\$278.5	\$217.5	Pre-Announcement	Post-Announcement	41%	2.4
Median		\$137.3	\$150.0	54%	19%	34%	2.0

Source: CapIQ, FactSet, Company press releases as of June 30, 2022. ND = Not Disclosed. NA = Not Applicable.

(1) Based on estimated cash runway pre and post-restructuring announcement (if available); otherwise estimated based on disclosed annualized cost savings and consensus EBIT estimates.

(2) Genocea subsequently announced intentions to wind down operations.

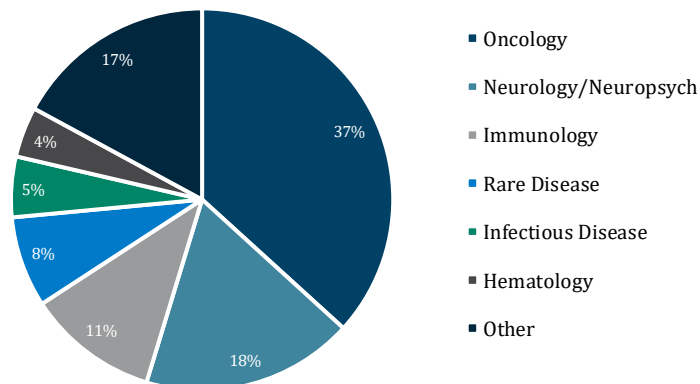
Q2 2022 Clinical Catalysts Analysis

- Investor frustration exacerbated by muted stock price reactions to “positive” clinical data – with median 1-day stock price performance for “positive” data only +2.4%
- Higher degree of data scrutiny, resulting in negative reactions to “positive” data
- Select companies have successfully raised catalyst-driven follow-ons after meaningful stock price appreciation

Key Takeaways

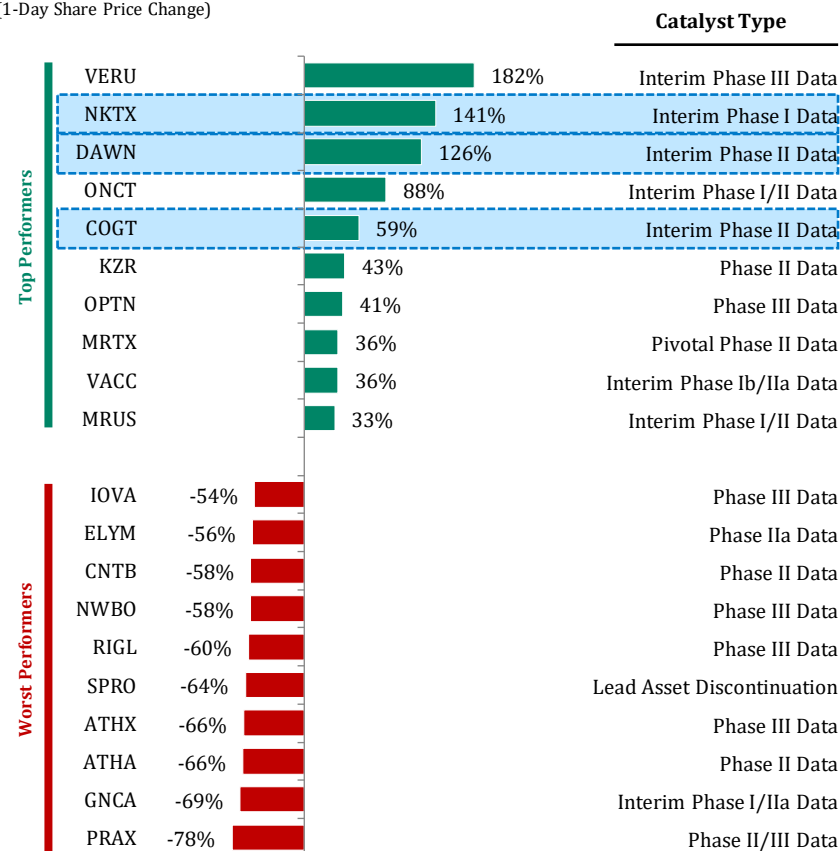
- William Blair analyzed 117 key clinical data readouts in Q2 2022 for US-listed biopharma companies with a market cap <\$10 billion
 - Of these clinical catalysts, only 21% were considered “negative”
- Median stock price performance for “positive” clinical data (N=92):
 - 1-day performance: **+2.4%**
 - 1-week performance: **+2.0%**
- Median stock price performance for “negative” clinical data (N=25):
 - 1-day performance: **(37.8%)**
 - 1-week performance: **(36.3%)**
- 43% of all “positive” clinical catalysts in oncology (N=40)
- \$4.0+ billion in cumulative market cap lost across all clinical catalysts

Breakdown of Clinical Catalysts by Therapeutic Area



Top 10 Positive/Negative Movers

(1-Day Share Price Change)



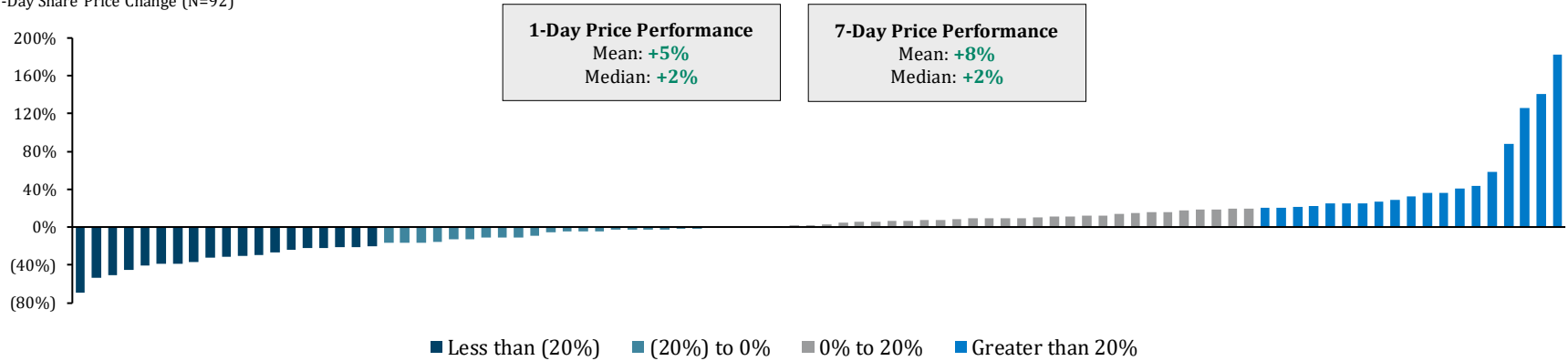
Executed Follow-on Post-Data

Q2 2022 Positive/Negative Clinical Catalyst Performance Detail

21% of positive clinical catalysts had a >20% one-day stock price movement, while 76% of negative clinical catalysts experienced a one-day price decline greater than 20%

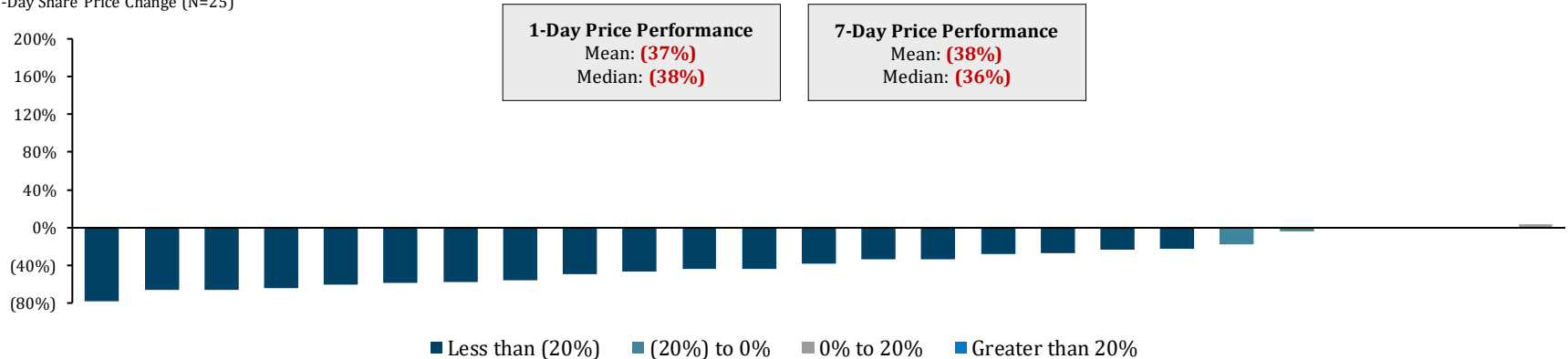
Performance Following a Positive Clinical Catalyst

1-Day Share Price Change (N=92)



Performance Following a Negative Clinical Catalyst

1-Day Share Price Change (N=25)



Note: Includes biopharma companies listed on major U.S. exchanges with market capitalization <\$10 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, 2022.

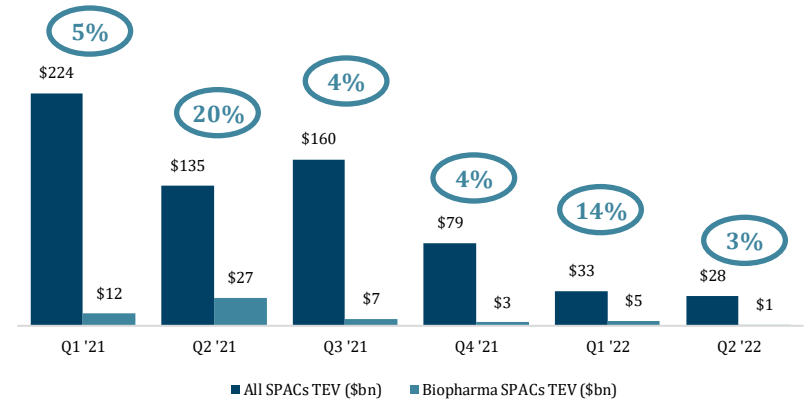
Q2 2022 Biopharma SPACs & Trading Performance

As the SPAC market has become increasingly challenged with higher redemptions and terminated mergers, PIPE has become more important both in terms of valuation and closing

Perspectives on the Current Market

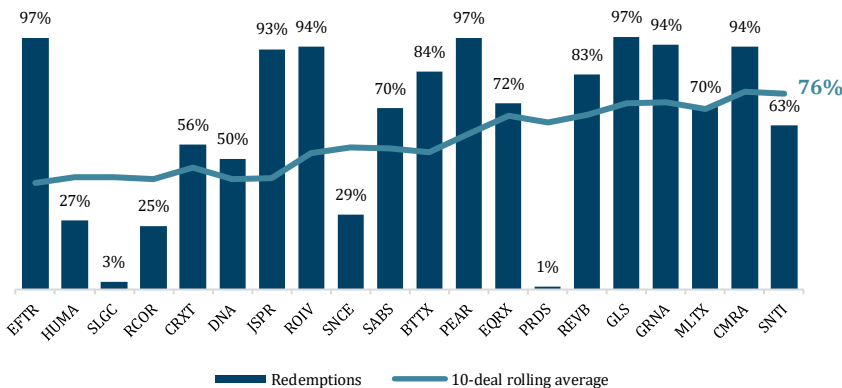
- The SPAC market remains challenged, continuing its correction from unprecedented levels of deal activity in 2020 and 2021 and proposed rule changes regarding SPAC disclosures and advisor liability introduced by the SEC in late March
- SPAC M&A activity remains at a pace more than four times pre-pandemic levels, with over 70 transactions announced YTD reflecting total enterprise value of over \$58 billion, **with biopharma representing ~20% of deals announced**
- During the last 12 months, the Biopharma sector has seen 26 transactions close, and **six transactions terminated**, three of which occurred in Q2 2022:
 - Silver Spike II / Eleusis
 - Biotech Acquisition Company / Blade Therapeutics
 - Isleworth Healthcare Acquisition Corp. / Cytovia
- 27 of 32 biopharma SPACs seeking an acquisition will hit their initial expiration date within the next 12 months

Biopharma as a % of Total deSPAC Volume



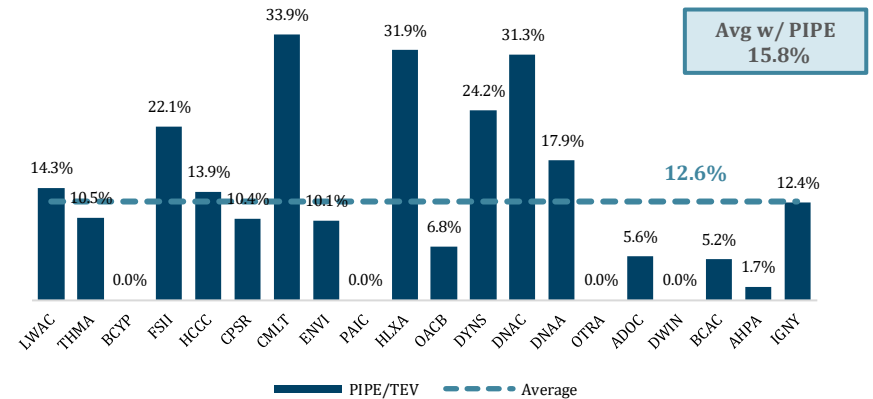
Redemption Trends

Last 20 Closed (NewCo Tickers)



M&A Structuring Trends: PIPE Sizing

Last 20 Announced (SPAC Tickers)



Note: Excludes SPACs with incomplete information available.
Source: William Blair, SPAC Research as of June 30, 2022.

Venture Debt in Biopharma

With sustained volatility in equity markets and valuations significantly off their highs, biopharma companies are looking to venture debt⁽¹⁾ to boost liquidity and provide a bridge to future equity rounds

Market Overview

- Cash-burning biopharma companies that have been able to tap aggressive equity markets for the better part of the last two years are now forced to look elsewhere to address mounting capital needs
- With more competition than ever and significant levels of dry powder, venture lenders are actively looking to deploy capital
 - Competition has also led to a significant increase in check sizes
 - While annual loan count has doubled since 2012, annual loan volume has increased nearly 10x during that time
- Given the lack of positive cash flow, venture lenders take a loan-to-value approach to underwriting
 - Significant equity cushions, along with a first-priority lien on the borrower's assets, allow venture lenders to remain aggressive when equity markets fluctuate
- Market volatility and decreasing valuations have slowed the speed of transactions as lenders dig deeper into fundamentals
 - Lenders are generally looking for broad pipelines, strong management teams, and the ability to raise additional capital

Recent Venture Debt Financings for Public Biopharma Companies

(\$ in millions)

Date	Company	Available at Close	Total Facility ⁽²⁾	Interest Rate	LTM at Close ⁽³⁾		Market Cap at Close	Debt / Market Cap	Facility / Market Cap	Phase of Development
					Revenue	EBITDA				
06/30/22	9 Meters Biopharma, Inc.	\$20	\$70	7.12%	\$0	(\$37)	\$86	23.2%	58.1%	Phase II
06/30/22	Blueprint Medicines Corporation	\$150	\$400	8.62%	\$221	(\$641)	\$3,110	12.9%	21.2%	Approved
06/16/22	Akero Therapeutics, Inc.	\$20	\$100	8.40%	\$0	(\$112)	\$363	5.5%	27.5%	Phase II
06/07/22	Eiger BioPharmaceuticals, Inc.	\$75	\$75	8.50%	\$11	(\$83)	\$264	28.4%	28.4%	Approved
05/24/22	CASI Pharmaceuticals, Inc.	\$10	\$10	5.10%	\$33	(\$31)	\$56	17.7%	17.7%	Approved
05/16/22	Inventiva S.A.	\$24	\$48	8.00%	\$10	(\$58)	\$363	6.6%	13.2%	Phase III
05/05/22	Pliant Therapeutics, Inc.	\$25	\$100	10.19%	\$7	(\$101)	\$192	13.0%	52.0%	Phase II
04/22/22	Savara Inc.	\$27	\$27	4.25%	\$0	(\$39)	\$140	18.9%	18.9%	Phase III
04/19/22	BioXcel Therapeutics, Inc.	\$70	\$135	10.25%	\$0	(\$112)	\$418	16.8%	32.3%	Approved
04/05/22	Fusion Pharmaceuticals Inc.	\$25	\$75	9.59%	\$2	(\$84)	\$330	7.6%	22.7%	Phase I
Mean (N=12)		\$41	\$97	8.16%	\$24	(\$121)	\$489	16.4%	33.4%	
Median		\$25	\$75	8.56%	\$2	(\$83)	\$297	14.9%	25.1%	
Minimum		\$10	\$10	4.25%	\$0	(\$641)	\$48	5.1%	13.2%	
Maximum		\$150	\$400	10.25%	\$221	(\$31)	\$3,110	41.6%	93.6%	

Source: CapIQ, PitchBook Data, Inc., and SEC filings as of June 30, 2022.

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

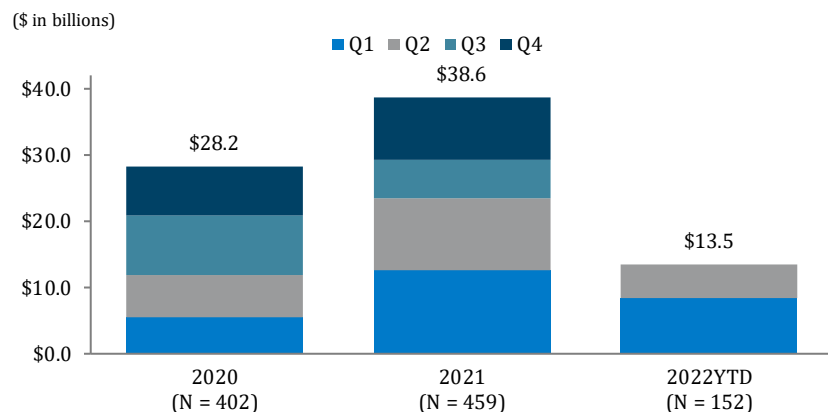
(2) Represents total commitment and includes undrawn revolvers and additional tranches of debt / delayed draw facilities.

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

Biopharma Private Financings Trends

- Public markets beginning to put pressure on private markets, with \$5B decrease in total private biopharma financing activity in Q2 2022 compared to Q2 2021
- Slowdown in crossover activity continued in Q2 2022; however robust activity over the last 2+ years has created significant backlog of IPO, reverse merger and/or SPAC candidates

Total Proceeds and Deal Volume



Crossover Deals Analysis⁽¹⁾

(\$ in millions)

Quarter	Number of Deals	Median Deal Size	Median Pre-Money	Median Step-Up	Currently Private	Currently Public
Q1 2020	18	\$101	\$149	1.3x	2	16
Q2 2020	23	\$100	\$144	1.5x	5	18
Q3 2020	26	\$97	\$226	1.4x	6	20
Q4 2020	23	\$82	\$200	1.5x	4	19
Q1 2021	36	\$108	\$211	2.0x	8	28
Q2 2021	24	\$109	\$250	2.2x	17	7
Q3 2021	24	\$100	\$220	1.6x	19	5
Q4 2021	10	\$141	\$331	2.9x	9	1
Q1 2022	12	\$116	\$300	2.3x	12	0
Q2 2022	12	\$133	\$208	2.0x	12	0

Source: CapIQ, PitchBook Data, Inc., FactSet, and SEC Filings as of June 30, 2022. AI/ML = Artificial Intelligence/Machine Learning.

(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).

Private Financings by Indication and Modality

(\$ in billions)

Indication/Modality	2021		Q1 2022		Q2 2022	
	Value	Number of Deals	Value	Number of Deals	Value	Number of Deals
Oncology	\$14.2	202	\$2.1	32	\$1.6	27
AI/ML	\$3.8	49	\$1.1	15	\$0.7	11
Gene/Cell Therapy	\$9.3	131	\$0.9	18	\$1.9	17
Neurology/CNS	\$4.1	54	\$0.8	11	\$0.8	9
Immunology	\$2.7	30	\$0.6	8	\$1.1	13
Infectious Disease	\$3.3	32	\$0.4	8	\$0.3	3
RNA/Oligonucleotide	\$3.3	30	\$0.3	5	\$0.3	4

Largest Private Company Raises in Q2 2022

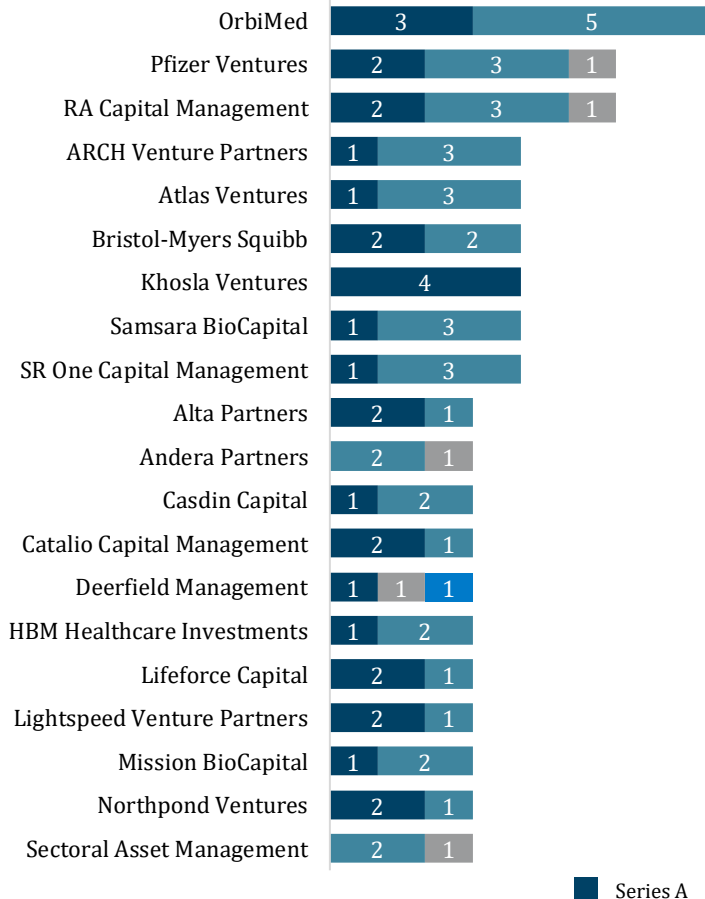
(\$ in millions)

Company	Indication	Round	Date	Deal Size
TESSERA	Multiple	Series C	4/19/22	\$300
KRIYA	Multiple	Series C	5/16/22	\$271
UpstreamBio	Inflammation	Series A	6/2/22	\$200
Retro	Rejuvenation	Series A	4/6/22	\$180
FRONTIERA	Ophthalmology	Series B	6/24/22	\$160
MOMA	Oncology	Series B	5/10/22	\$150

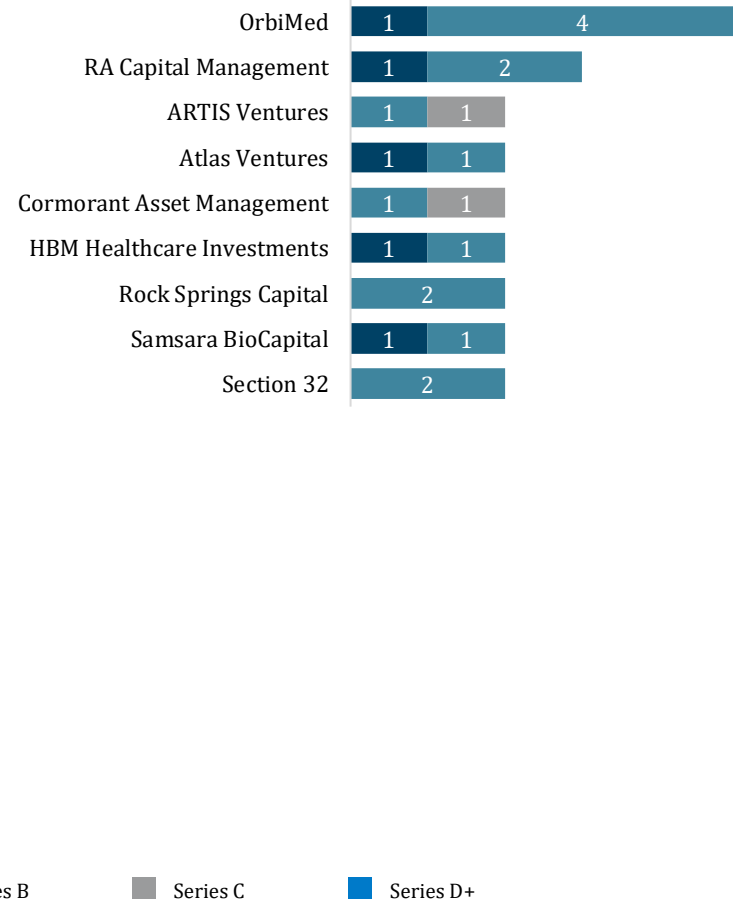
Q2 2022 Most Active Investors in Biopharma Private Financings

While total proceeds of private financings are down 53% in Q2 2022 compared to Q1 2022, strategics and non-traditional VC investors become increasingly active and mutual funds are almost nowhere to be found

Top Investors Across All Rounds



Top Investors in Crossover Rounds⁽¹⁾



Note: Includes both crossover rounds as well private rounds for companies that are expected to file publicly through the next round of investing.

Source: CapIQ, PitchBook Data, Inc., FactSet, and SEC Filings as of June 30, 2022.

(1) Crossover round defined as either a \$50M+ raise (Series B onwards) or a \$100M+ raise (Series A) with multiple crossover and/or large mutual funds in the syndicate.

Q2 2022 Public Biopharma M&A Activity

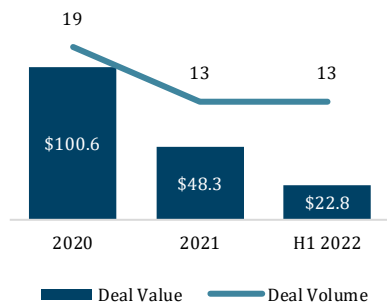
Public biopharma M&A volume picked up significantly in Q2 2022, with a total of 10 public company acquisitions (compared to only 3 in Q1 2022); notably 30% of deals were take-private transactions

Public M&A Overview

- Despite elevated volume, median total deal values and premiums down from 2021 levels:
 - Total deal value:** \$482M in Q2 2022 (vs. \$1,900M in 2021)
 - 1-day premium:** 66% premium in Q2 2022 (vs. 76% premium in 2021)
- 50% of deals in Q2 2022 involved marketed assets, with 80% of deals employing all-upfront payment considerations
- Increasing appetite from venture/private equity firms for take-private acquisitions:
 - Announced acquisitions from Gurnet Point/Patient Square, EW Healthcare, and Innoviva
 - Additional public bids for Zymeworks from All Blue Capital and for Stealth BioTherapeutics from Morningside Venture/J. Wood Capital Advisors

Total Deal Value and Volume

(\$ in billions)



Q2 2022 Public M&A Activity Detail

(\$ in millions)

Date Announced	Acquirer	Target	Total Deal Value	Total Upfront	Total Milestones	Premium		Lead Asset at Signing			
						1-Day Premium	30-Day Premium	Name	Phase	Therapeutic Area	Modality
06/27/22	Ipsen	Epizyme	\$418	\$247	\$171	53%	144%	Tazverik	Marketed	Oncology	Small molecule
06/23/22	Gurnet Point, Patient Square	Radius Health	\$547	\$497	\$50	12%	45%	Tymlos	Marketed	Musculoskeletal	Peptide
06/23/22	invoX Pharma	F-star Therapeutics	\$161	\$161	-	79%	137%	FS118	Phase II	Oncology	Antibody
06/03/22	Bristol Myers Squibb	Turning Point Therapeutics	\$4,100	\$4,100	-	122%	138%	Repotrectinib	Phase II	Oncology	Small molecule
05/31/22	EW Healthcare	TherapeuticsMD	\$177	\$177	-	367%	212%	Annovera	Marketed	Women's Health	Small molecule
05/23/22	Innoviva	Entasis Therapeutics	\$113 ⁽¹⁾	\$113	-	50%	11%	SUL-DUR	Phase III	Infectious Disease	Small molecule
05/10/22	Pfizer	Biohaven	\$11,600	\$11,600	-	79%	39%	Nurtec ODT	Marketed	Neurology	Small molecule
04/19/22	Regeneron	Checkmate Pharmaceuticals	\$250	\$250	-	336%	243%	Vidutolimod	Phase I	Oncology	Virus-like Particle
04/13/22	Halozyyme	Antares Pharma	\$960	\$960	-	50%	42%	Xyosted	Marketed	Endocrine/Metabolic	Small molecule
04/13/22	GlaxoSmithKline	Sierra Oncology	\$1,900	\$1,900	-	39%	63%	Momelotinib	Phase III	Oncology	Small molecule
Mean (N=10)			\$2,023	\$2,001	\$110	119%	107%				
Median			\$482	\$374	\$110	66%	100%				

Note: M&A activity includes deals with disclosed total deal value of \$20M+. Premium calculated using last unaffected trade date prior to acquisition. Source: PitchBook Data, Inc., Company press releases and SEC filings as of June 30, 2022.

(1) Innoviva owned 60% of Entasis common stock prior to acquisition. Acquisition valued Entasis' equity at \$113 million on a fully diluted basis.

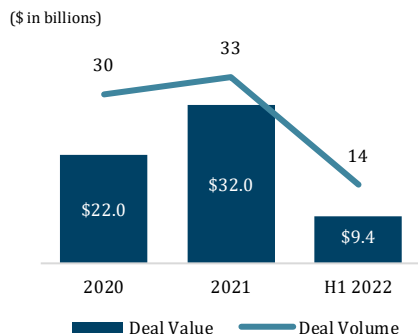
Q2 2022 Private Biopharma M&A Activity

Private biopharma M&A volume largely in-line with 2021 levels despite lower total deal sizes, with 8 private company buyouts with disclosed terms in Q2 2022

Private M&A Overview

- Private M&A transaction volume up from Q1 2022 levels and on pace with 2020 and 2021 transaction volumes
 - 8 deals in Q2 2022 (vs. 6 deals in Q1 2022)
- Median total deal values have trended below 2021 levels, attributable to lower total potential milestone considerations:
 - Total deal value:** \$269M in Q2 2022 (vs. \$470M in 2021)
 - Upfront:** \$133M in Q2 2022 (vs. \$120M in 2021)
 - Milestones:** \$62M in Q2 2022 (vs. \$335M in 2021)
- 50% of private acquisitions in Q2 2022 had all-upfront deal considerations
- 75% of acquisitions for platform companies
- 85% of deals with disclosed lead assets were for Phase I or II clinical-stage assets

Total Deal Value and Volume



Q2 2022 Private M&A Activity Detail

(\$ in millions)

Date Announced	Acquirer	Target	Total Deal Value	Total Upfront	Total Milestones	Lead Asset at Signing			
						Name	Phase	Therapeutic Area	Modality
06/21/22	Galapagos	CellPoint	\$239	\$133	\$106	CD19 CAR-T therapy	Phase I/II	Oncology	Cell Therapy
06/08/22	CureVac	Frame Cancer Therapeutics	\$34.3	\$17.2	\$17.2	FRAME-001	Phase I	Oncology	Vaccine
05/31/22	GlaxoSmithKline	Affinivax	\$3,300	\$2,100	\$1,200	AFX3772	Phase II	Infectious disease	Vaccine
05/23/22	Mirum Pharmaceuticals	Satiogen Pharmaceuticals	\$24	\$19	\$5	Livmarli (maralixibat)	Marketed	Hepatic	Small molecule
05/09/22	Opko Health	ModeX Therapeutics	\$300	\$300	-	ND	ND	Oncology/ Infectious disease	Antibody
04/29/22	Global Cord Blood Corporation	Cellenkos	\$2,039	\$2,039	-	CK0802	Phase I	Immunology	Cell Therapy
04/27/22	Caladrius Biosciences	Cend Therapeutics	\$90	\$90	-	CEND-1	Phase II	Oncology	Peptide
04/07/22	Pfizer	ReViral	\$525	ND	ND	Sisunatovir	Phase II	Infectious disease	Small molecule
Mean (N=8)			\$819	\$671	\$332				
Median			\$269	\$133	\$62				

Note: M&A activity includes deals with disclosed total deal value of \$20M+.

Source: PitchBook Data, Inc., Company press releases and websites as of June 30, 2022. ND = Not Disclosed.

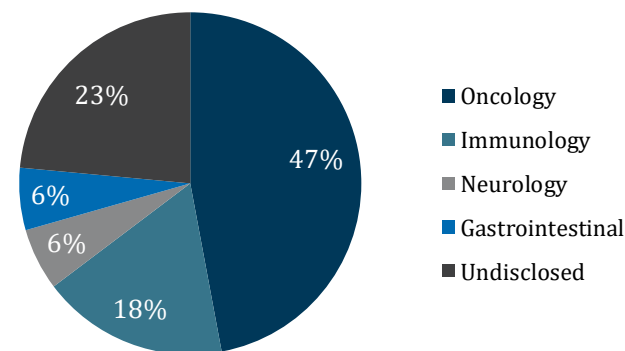
Increased Activity in Early-Stage Partnerships and Collaborations in H1 2022

Although the number of Q2 2022 early-stage partnerships remain on par with Q2 2021, overall partnerships in H1 2022 are up ~30% from the same period in 2021

Q2 2022 Early-Stage⁽¹⁾ Partnerships & Collaboration

Overview

- 17 early-stage collaborations announced in Q2 2022 (compared to 17 in Q2 2021)
- Median economic deal terms for early-stage collaborations/partnerships in Q2 2022 largely in line with 2021:
 - **Upfront (Cash + Equity):** \$37M in Q2 2022 (vs. \$30M in 2021)
 - **Milestones:** \$760M in Q2 2022 (vs. \$804M in 2021)
 - **Total deal value:** \$695M in Q2 2022 (vs. \$880M in 2021)
- Platform-focused partnerships continued to account for the vast majority of early-stage collaborations (88% in Q2 2022 vs. 83% in 2021)
- 59% (N=10) of partnering activity in Q2 2022 have been for small molecules, including 3 of which were in the protein degradation space



Top 5 Collaborations by Upfront Payment in Q2 2022

(\$ in millions)

Announced Date	Licensor	Licensee	Deal Details	Total Deal Value	Total Upfront Payment	Equity Investment	Milestones
05/10/2022	evotec	Bristol Myers Squibb	Collaboration to develop molecular glue degraders	\$5,000	\$200	NA	\$4,800
06/27/2022	SUTRO BIOPHARMA	astellas	Strategic collaboration for novel immunostimulatory antibody-drug conjugates	\$513	\$90	NA	\$423
06/22/2022	PRECISION BIOSCIENCES	NOVARTIS	Collaboration in potentially curative gene editing program for hemoglobinopathies	\$1,475	\$75	\$25	\$1,400
06/02/2022	immatics	Bristol Myers Squibb	Strategic alliance expansion to develop gamma delta T allogeneic cell therapy programs	\$4,260	\$60	NA	\$4,200
05/04/2022	AMPHISTA THERAPEUTICS	MERCK	Strategic collaboration for discovery and development of targeted protein degradation therapeutics	\$1,044	\$44	NA	\$1,000

Note: Partnership data excludes traditional out-licensing deals, COVID-related partnerships and partnerships with undisclosed deal terms.

Source: Company press releases and SEC filings as of June 30, 2022. NA = Not Applicable.

(1) Early stage defined as Phase 1 or earlier.

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