

1H 2019 biopharma VC & startup report

VC funding down 25%+ from 2018, IPO market on par with 2018

VC funding and M&A down, but IPO market strong

VC funding

\$6.7 billion

Global venture investment in biopharma in **1H2019**

Down 27% from \$9.1B in 1H2018

IPOs

23 VC-backed US IPOs¹

in 1H 2019 raised \$2.6B in IPO proceeds (vs. 46 IPOs in 2018)

Aggregate post-money valuation of \$14.3B after raising total of \$4.0B in venture capital

M&A

\$17 billion / \$21 billion

Upfront / total consideration for 9 VC-backed M&A exits² in 1H 2019

Down 29% from \$24B in upfront consideration in 1H 2018

¹Includes VC-backed biopharma IPOs that raised over \$50M on NASDAQ or NYSE, excludes non-therapeutics companies like ADPT and PSNL

²Includes mergers and acquisitions of VC-backed biotech startups that raised venture money since 2013 and were acquired for upfront consideration of at least \$75M

Source: Bay Bridge Bio, LLC, SEC filings, press releases, company websites

11 \$1B+ VC-backed M&A or IPOs in 1H2019

Lilly buys Loxo for \$8.0B



Roche buys Spark for \$4.8B



Ipsen buys Clementia for \$1.0B



Merck buys Peloton for \$1.0B
upfront



ALEC IPO, current valuation of
\$1.4B



GOSS IPO, current valuation of
\$1.4B



NGM IPO, current valuation of
\$1.0B



TPTX IPO, current valuation of
\$1.4B



CRTX IPO, current valuation of
\$1.2B



STOK IPO, current valuation of
\$1.0B



BBIO IPO, current valuation of
\$3.2B



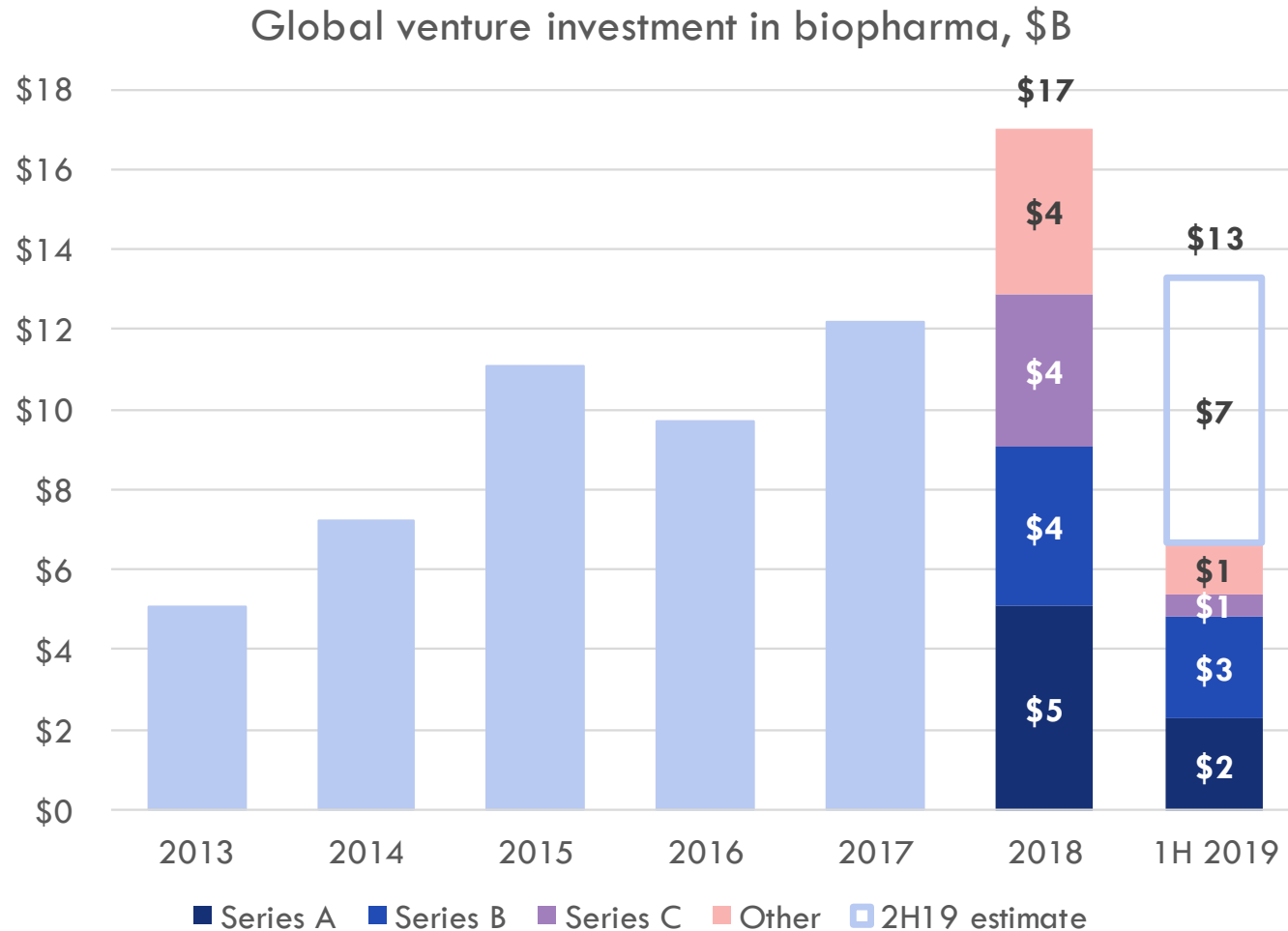
VC-backed M&A includes biotech companies acquired for at least \$75M upfront that raised venture capital since 2013 so excludes deals like PFE / ARRY, ABBV / AGN, BMY / CELG

Source: Bay Bridge Bio, LLC, SEC filings, press releases, company websites

VC funding update

VC funding strong but down over 25% from 2018

Global biopharma VC investment down 27%



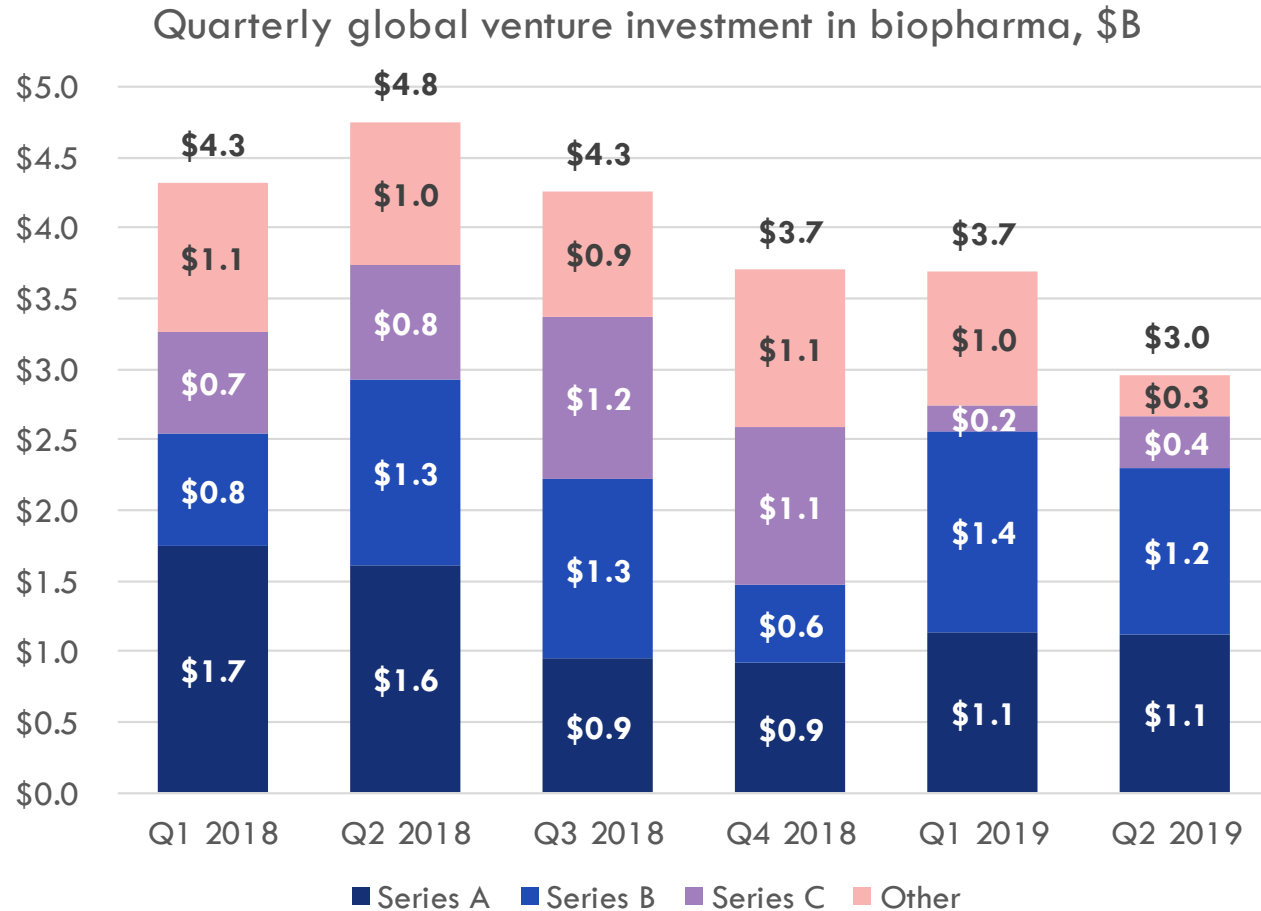
Biopharma VC investment **down 27%** in 1H 2019 vs 1H 2018

2019 still on pace to be second highest year on record

Source for 2013-2017 data: Evaluate Ltd. Vantage 2019 Preview http://www.evaluate.com/sites/default/files/media/download-files/Evaluate_Vantage_2019_Preview_0.pdf

Source for 2018-2019 data: Bay Bridge Bio, LLC, SEC filings, press releases, company websites

Late stage (Series C and later) funding down sharply



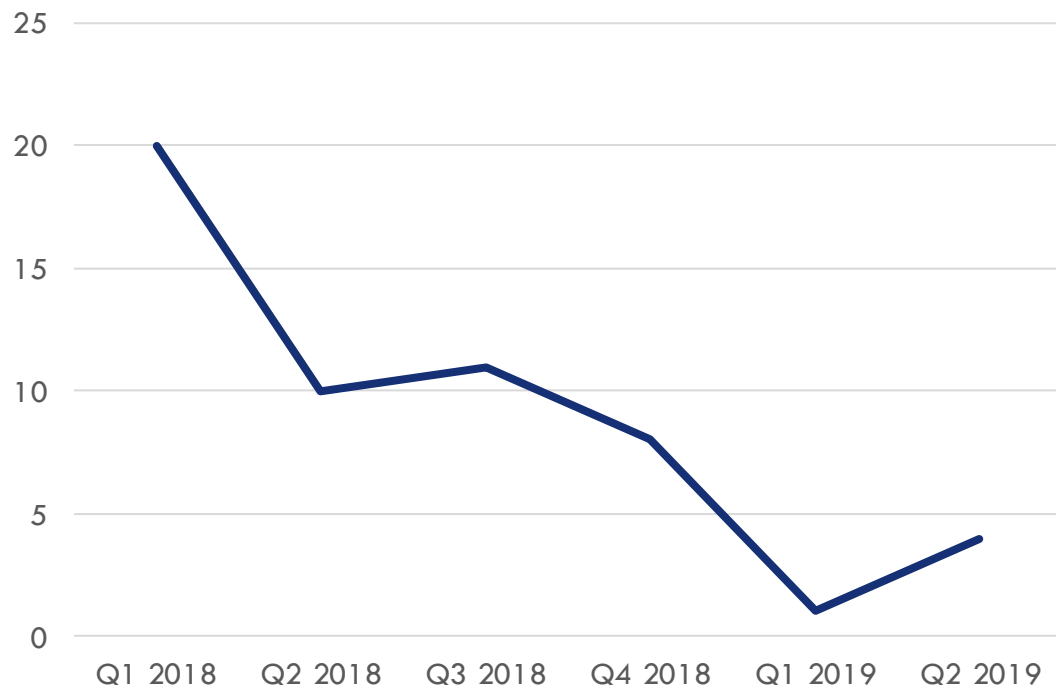
Series A funding has been steady at ~\$1B per quarter over the last year, though down from 1H 2018

Series B funding on pace to be **30% higher than 2018**, driven by 10% higher deal volume and 11% higher average deal size

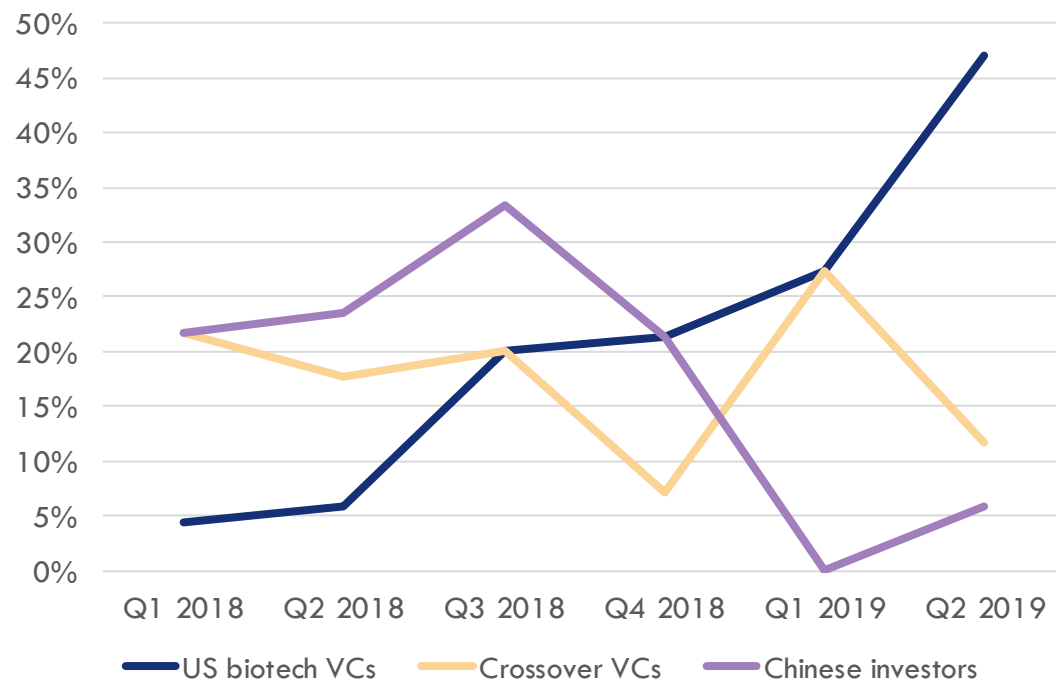
Source for 2018 data: Bay Bridge Bio, LLC, SEC filings, press releases, company websites

Chinese investment in US startups down 80%+

Number of Chinese lead investors in US biopharma startups by quarter



Percentage of Series B rounds in US biopharma companies led by various investor types

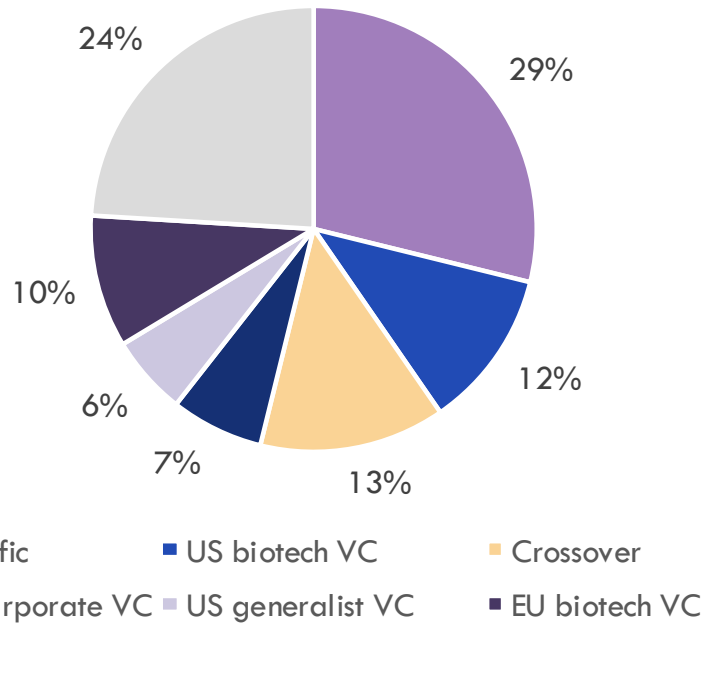


Trade tensions between the US and China have led to a dramatic decline in Chinese investment in US biopharma startups. Chinese investors dominated Series B funding in 2018, but have all but disappeared in 2019. US biotech VCs have picked up the slack – Series B investments in US biopharma startups is up in 1H 2019 compared to 1H 2018.

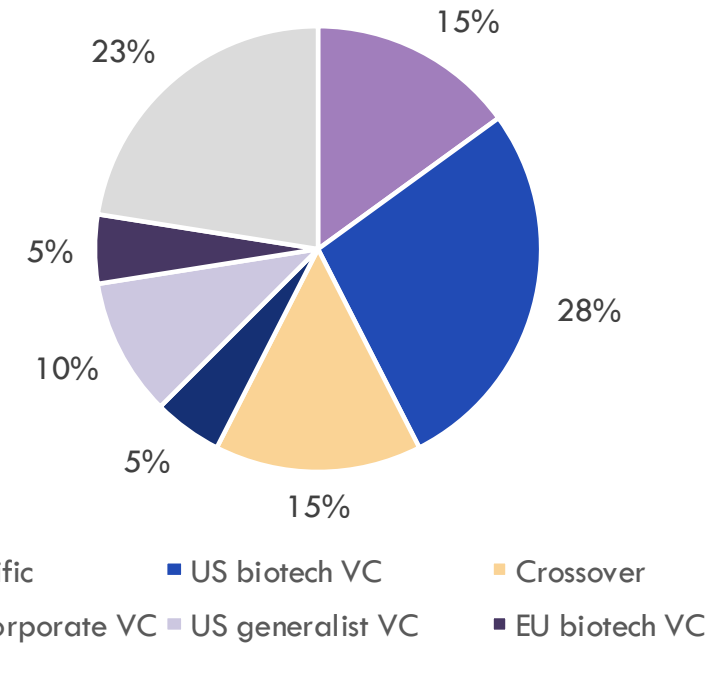
Source: Bay Bridge Bio, LLC, SEC filings, press releases, company websites

Trade tensions are changing Series B landscape

Series B lead investors in global biopharma startups by category, FY 2018



Series B lead investors in global biopharma startups by category, 1H 2019

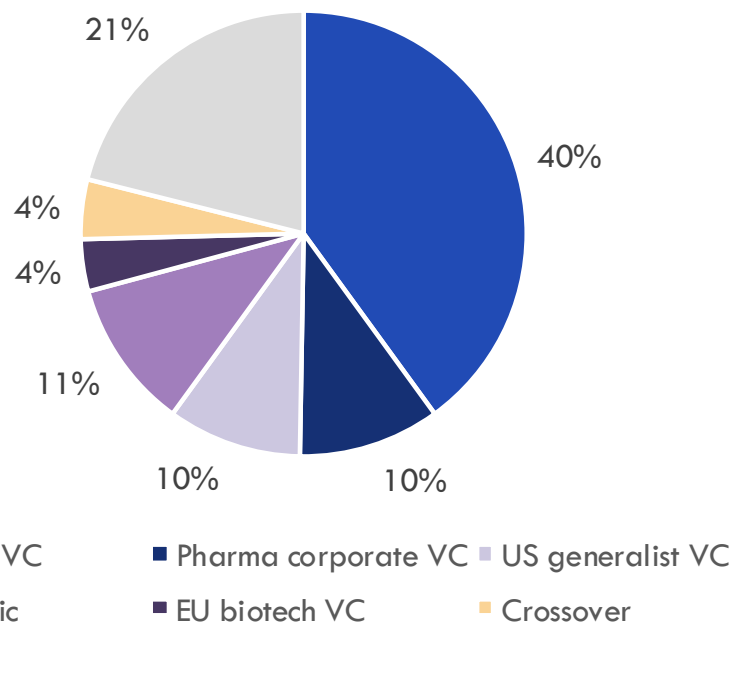


The retreat of Chinese investors from ex-China deals has changed the Series B funding market (Chinese investors still obviously actively fund Chinese startups). US biotech VCs have stepped in to replace Chinese investors in Series B deals.

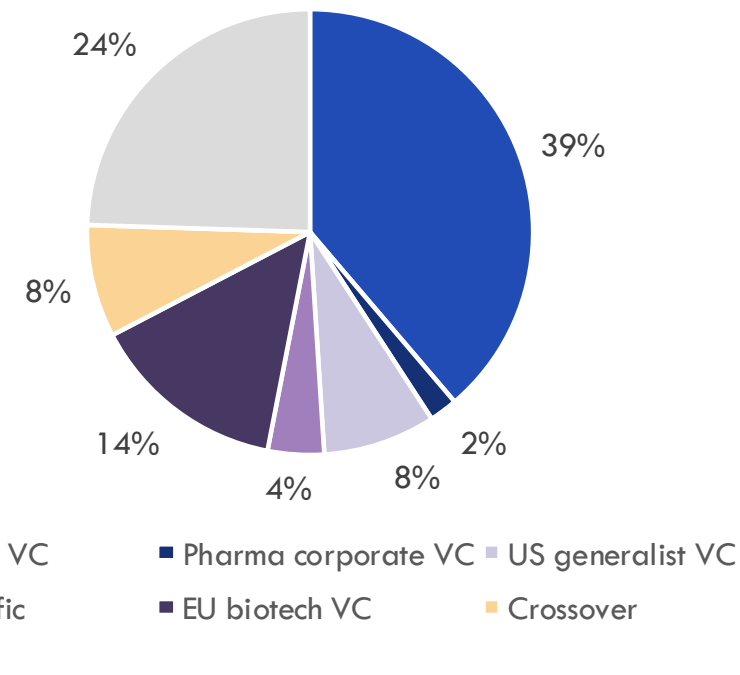
Source: Bay Bridge Bio, LLC, SEC filings, press releases, company websites

Specialists dominate Series A, generalists follow

Series A lead investors in global biopharma startups by category, FY 2018



Series A lead investors in global biopharma startups by category, 1H 2019

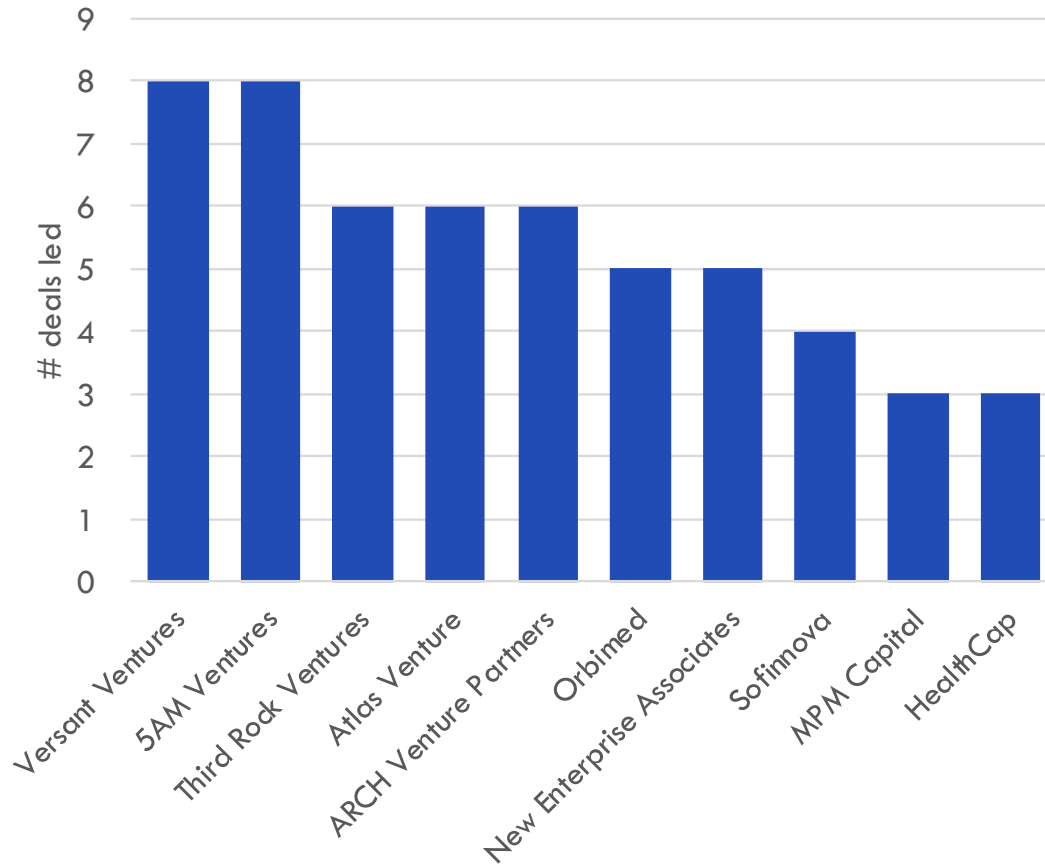


US biotech VCs dominate Series A funding. Specialist EU biotech VCs have gained share in 2019. Pharma VCs have retreated from leading Series A deals through the first half of 2019.

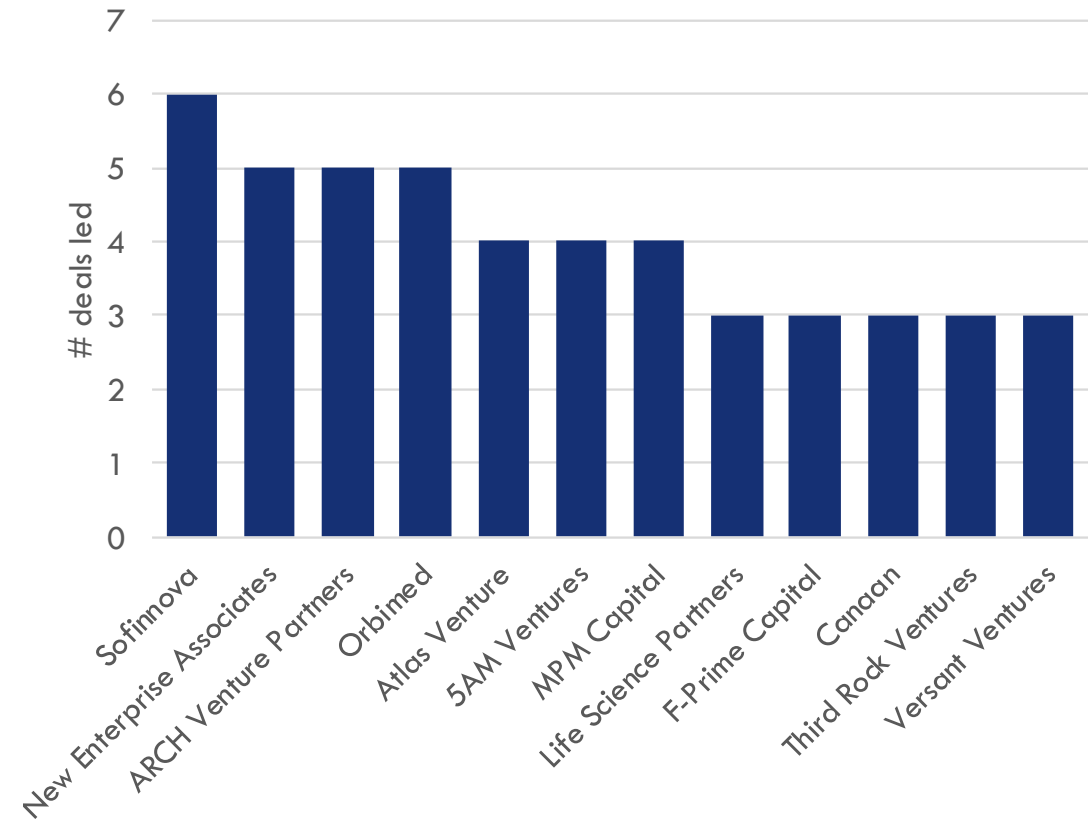
Source: Bay Bridge Bio, LLC, SEC filings, press releases, company websites

Sofinnova, NEA, Orbimed join top 5 Series A investors

Most active Series A lead investors, FY 2018



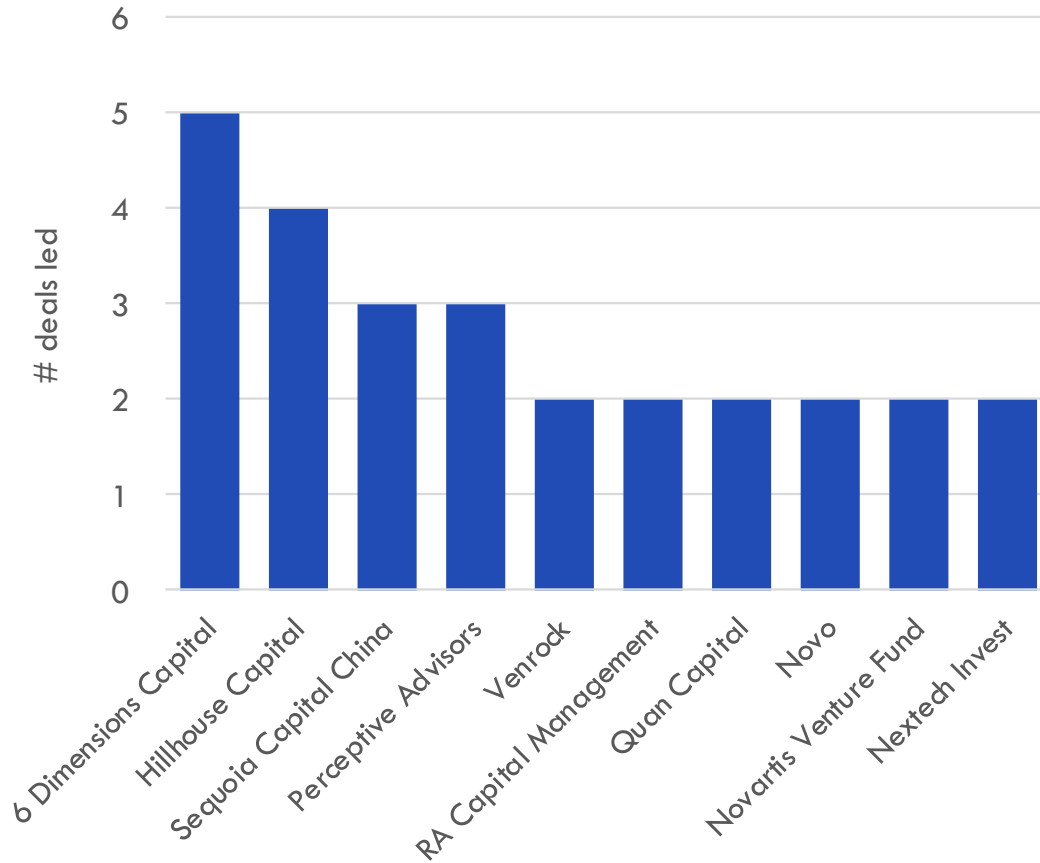
Most active Series A lead investors, LTM (2H2018-1H2019)



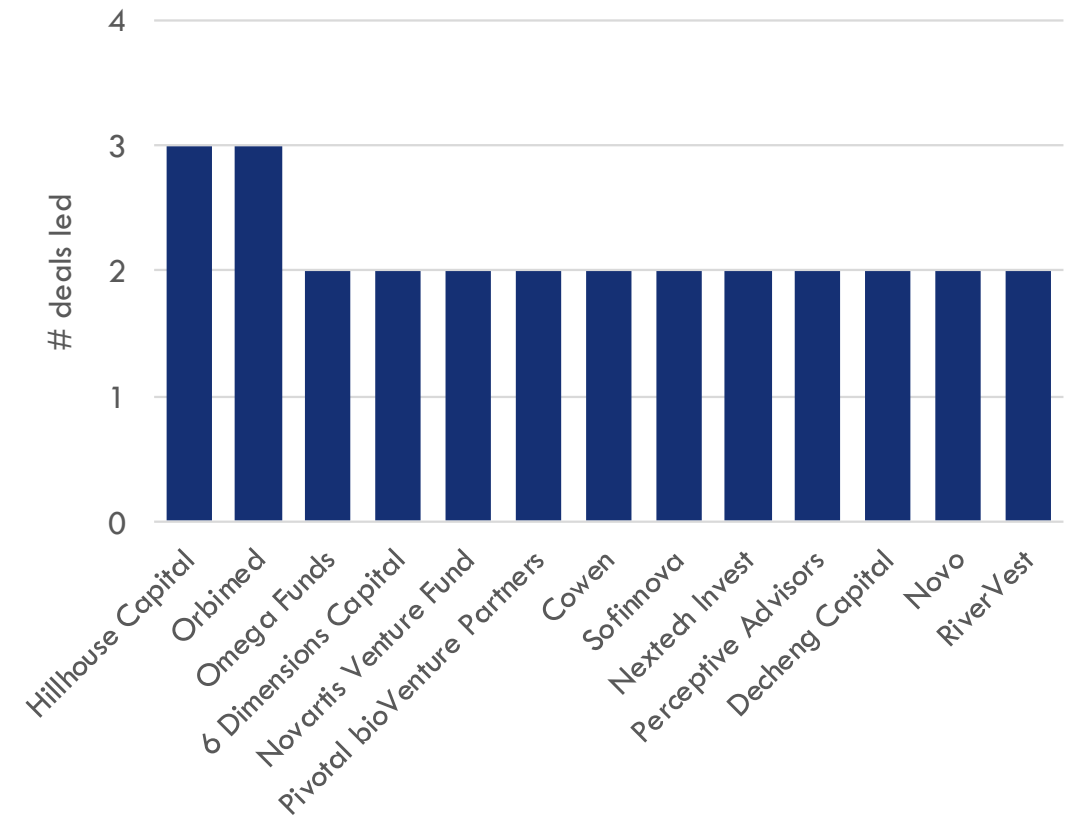
Note: not all Series A deals are disclosed. For example, Flagship rarely discloses Series A investments so they are not represented in these totals. We cannot guarantee that our database includes all Series A deals.
Source: Bay Bridge Bio, LLC, SEC filings, press releases, company websites

Few active lead Series B investors

Most active Series B lead investors, FY 2018



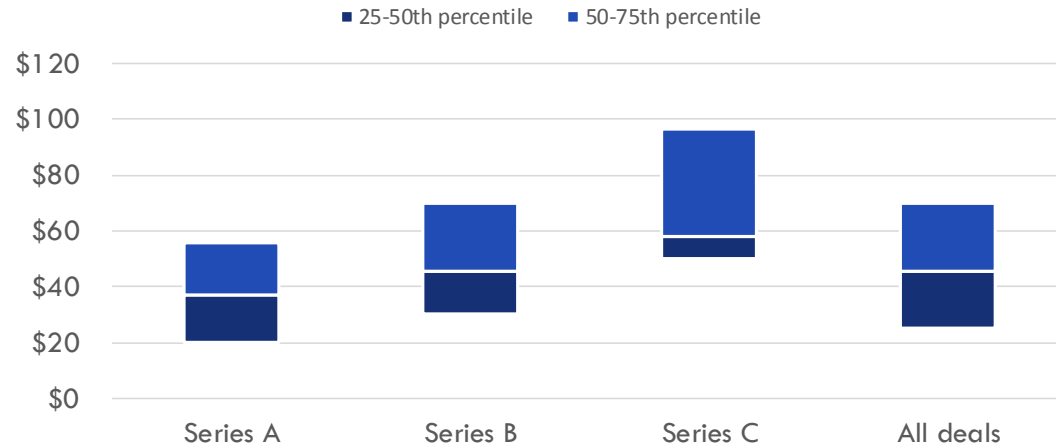
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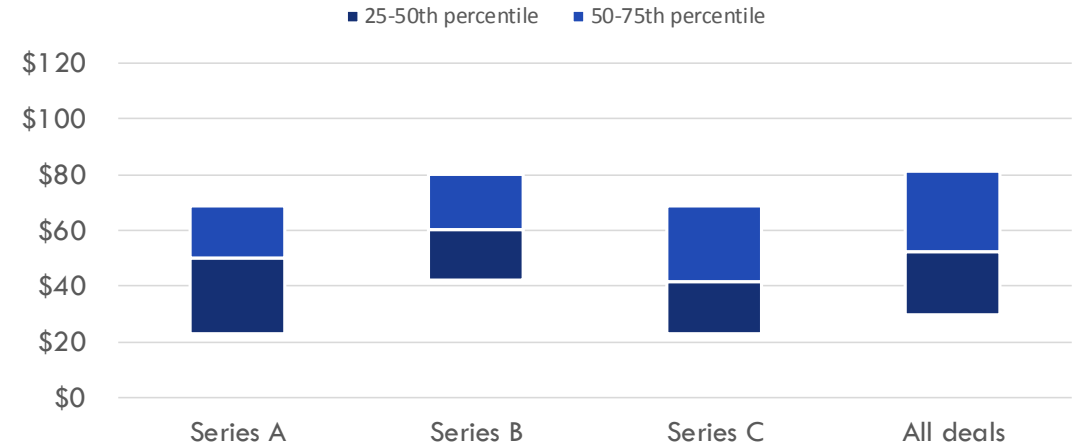
Fewer deals, but deals keep getting bigger

Venture investment size by round, FY 2018 (\$M)



25%	\$20	\$30	\$50	\$25
50%	\$37	\$45	\$58	\$45
75%	\$56	\$70	\$96	\$70
Mean	\$50	\$57	\$83	\$61
Count	103	69	46	277

Venture investment size by round, 1H 2019 (\$M)



25%	\$23	\$42	\$23	\$30
50%	\$50	\$60	\$42	\$53
75%	\$69	\$80	\$69	\$81
Mean	\$61	\$63	\$55	\$64
Count	37	41	10	104

19% of Series A rounds in 1H2019 were \$100M+, up from 11% in 2018

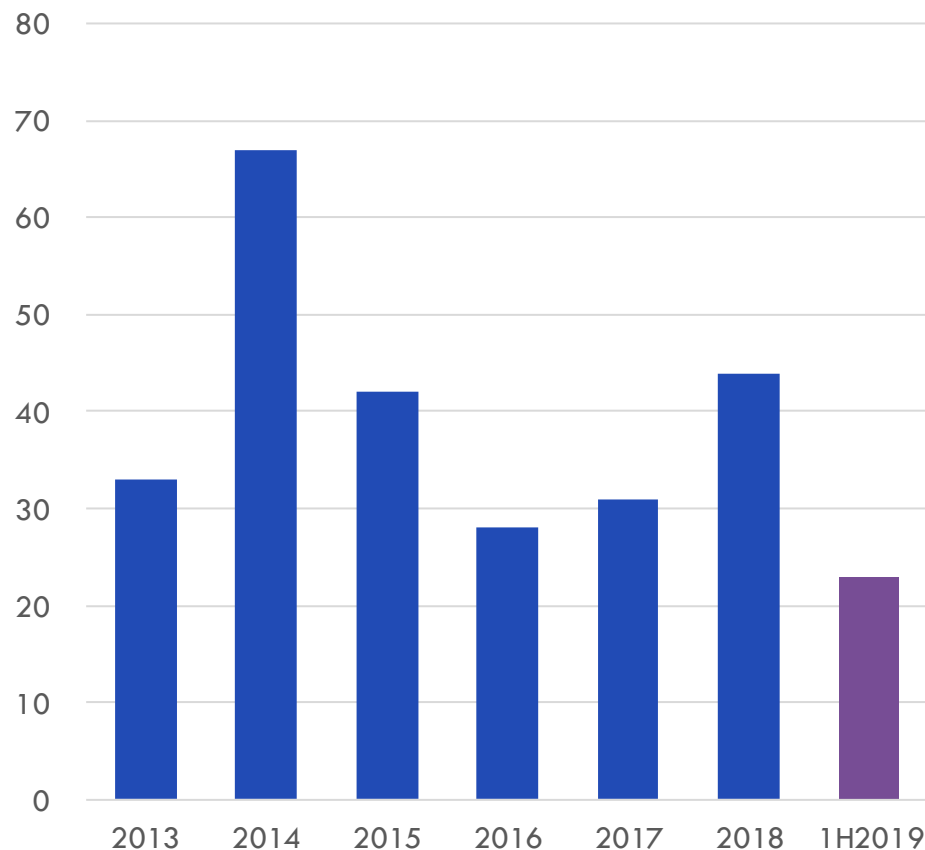
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IPO market update

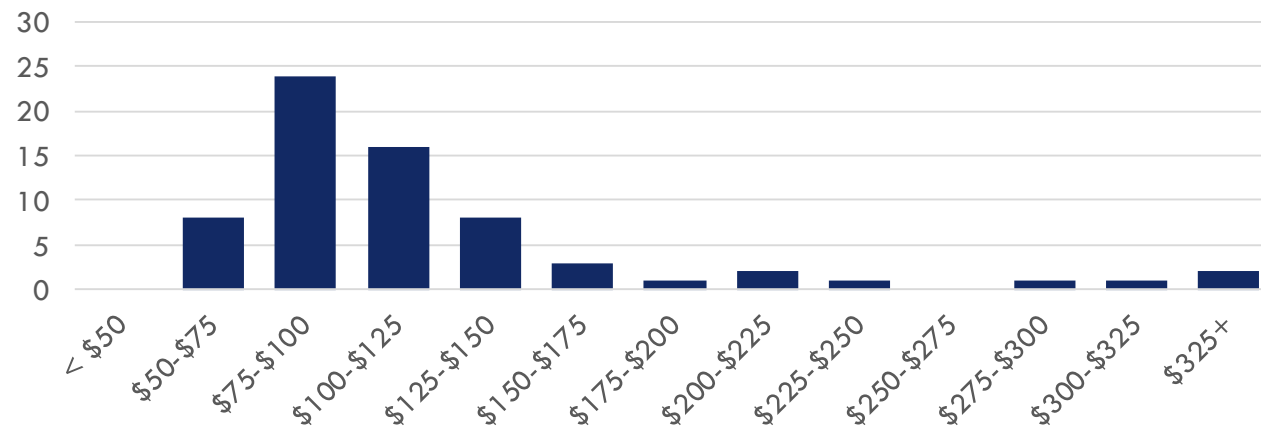
IPO market on pace to match 2018 levels

IPO window still open

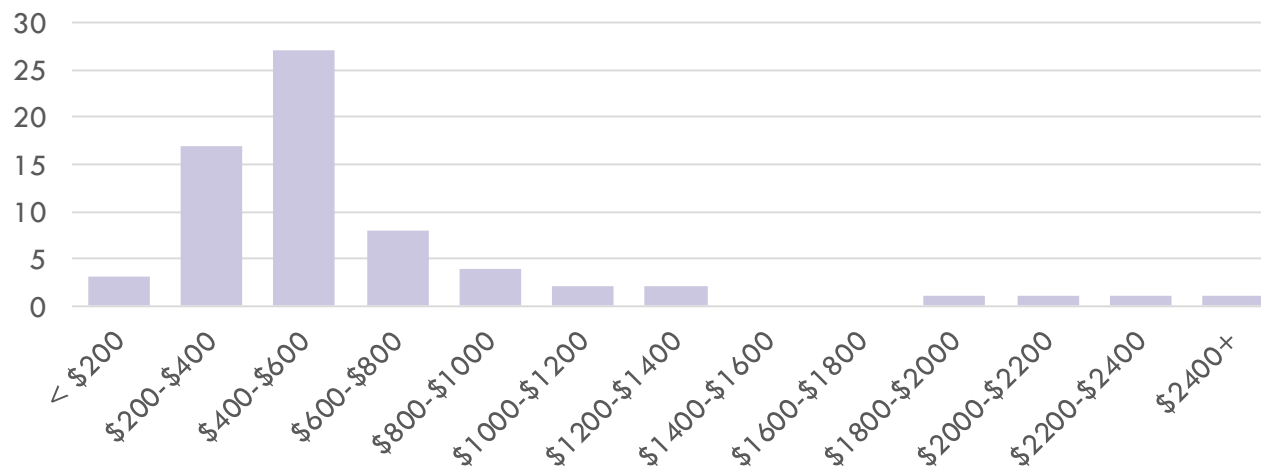
Number of VC backed biotech IPOs over \$50M



Number of IPOs by proceeds raised (\$M)



Number of IPOs by post-money valuations (\$M)

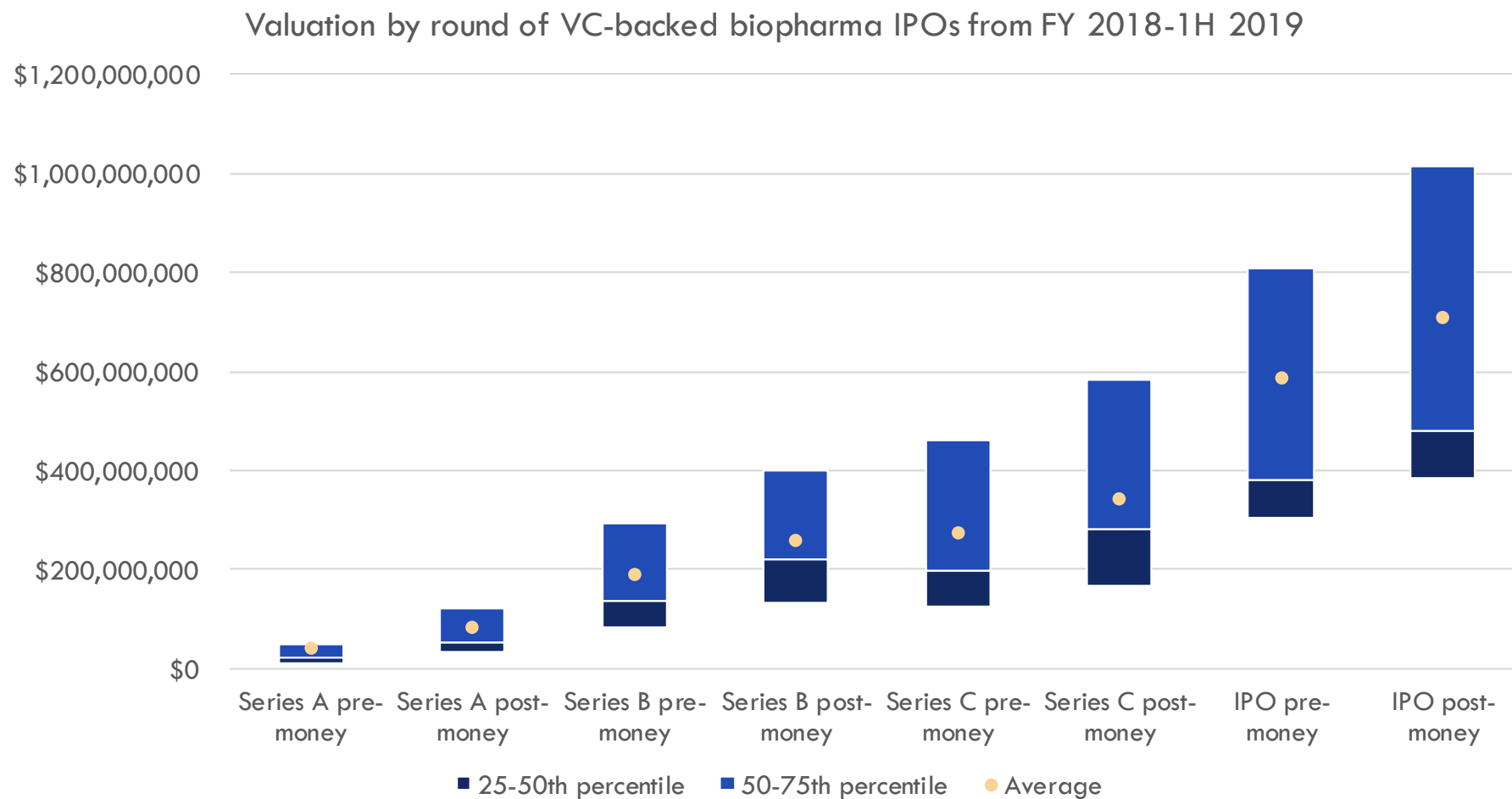


Source: Bay Bridge Bio, LLC, SEC filings, press releases, company websites

Source for 2014-2017 data: SVB Trends in Healthcare Investments and Exits Report Mid-Year 2018, SVB and Pitchbook

VC-backed biotech IPOs over \$50M include VRCA SURF LOGC TORC ARDS KZR UMRX THOR REPL AVRO EIDX CRNX KOD ETTX XERS SRRK MNLO YMAB ARVN MGTX ITRM APTX FIXX SLDB MGTA ALLK LQDA TBIO FTSV TCDA NTGN EVLO ARMO GRTS PRNB AUTL STRO UBX RCUS RUBY CNST TWST KNSA ORTX ALLO MRNA ALEC HARP GOSS TCRR KLDO DTIL NGM TPTX HOOK TRVI AXLA NXTX CRTX MIST IDYA BCYC STOK AKRO BCEL PRVL MORF KRTX

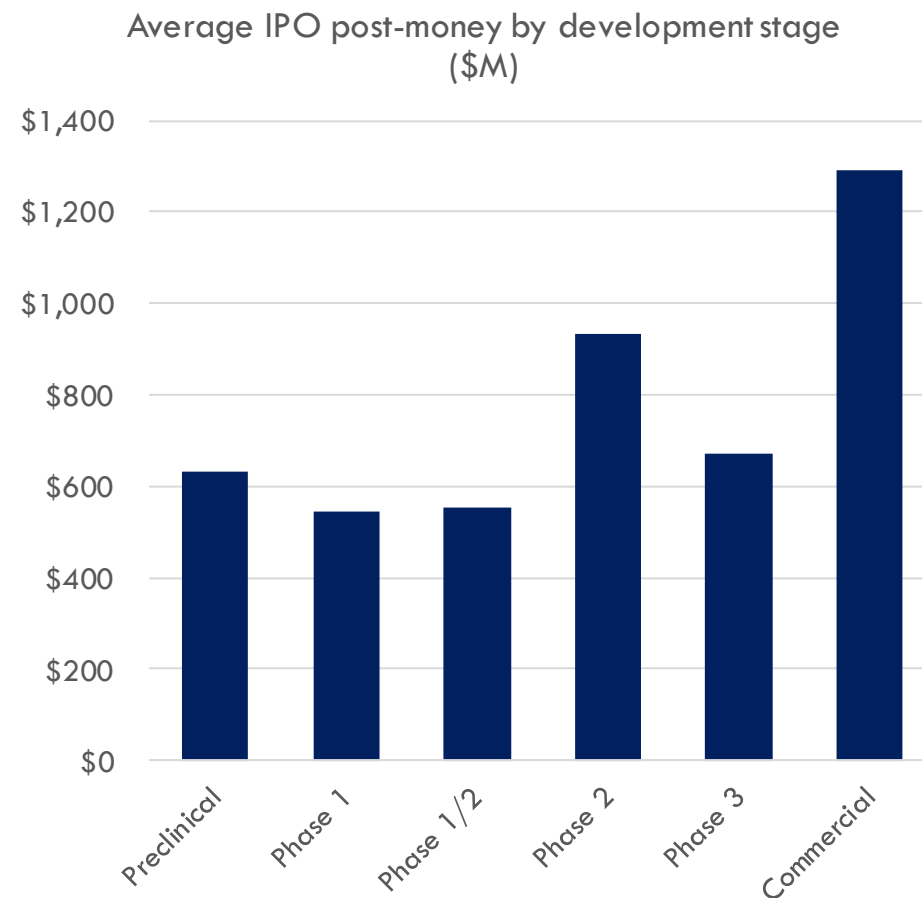
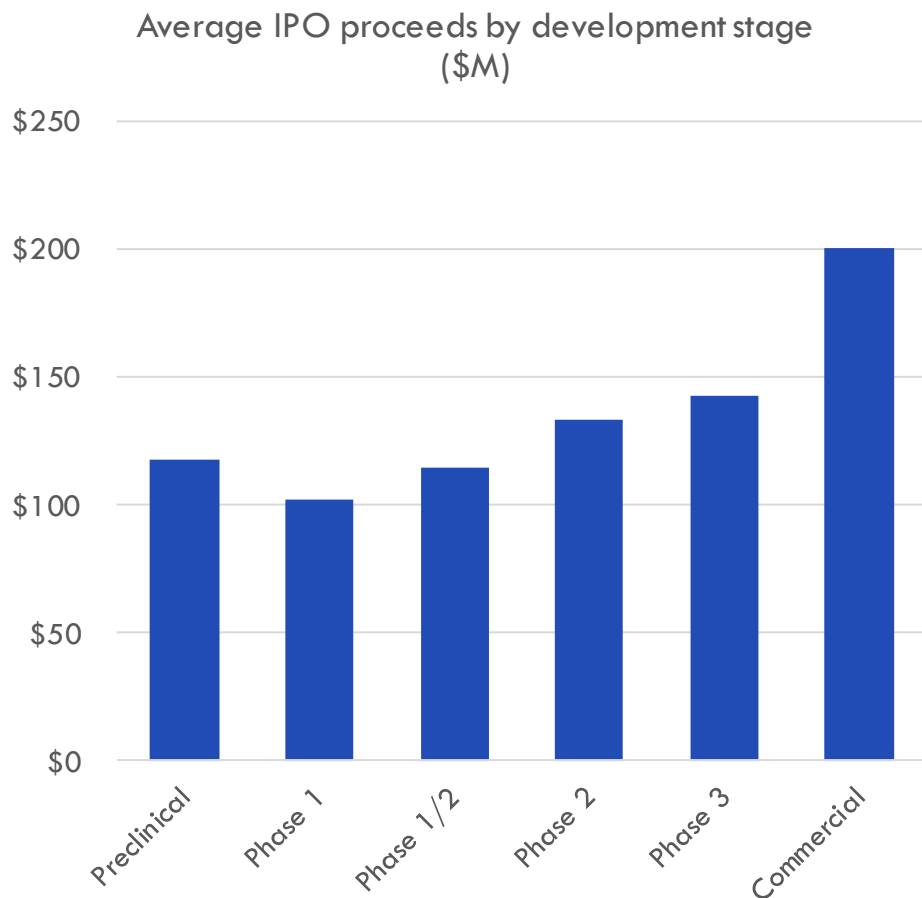
Venture round valuations of recent IPOs



Valuations are estimates based on publicly available information from SEC filings. For more on methodology, visit https://www.baybridgebio.com/blog/ipo_2018_q12019.html

Source: Bay Bridge Bio, LLC, SEC filings, press releases, company websites

Robust valuations even for preclinical assets



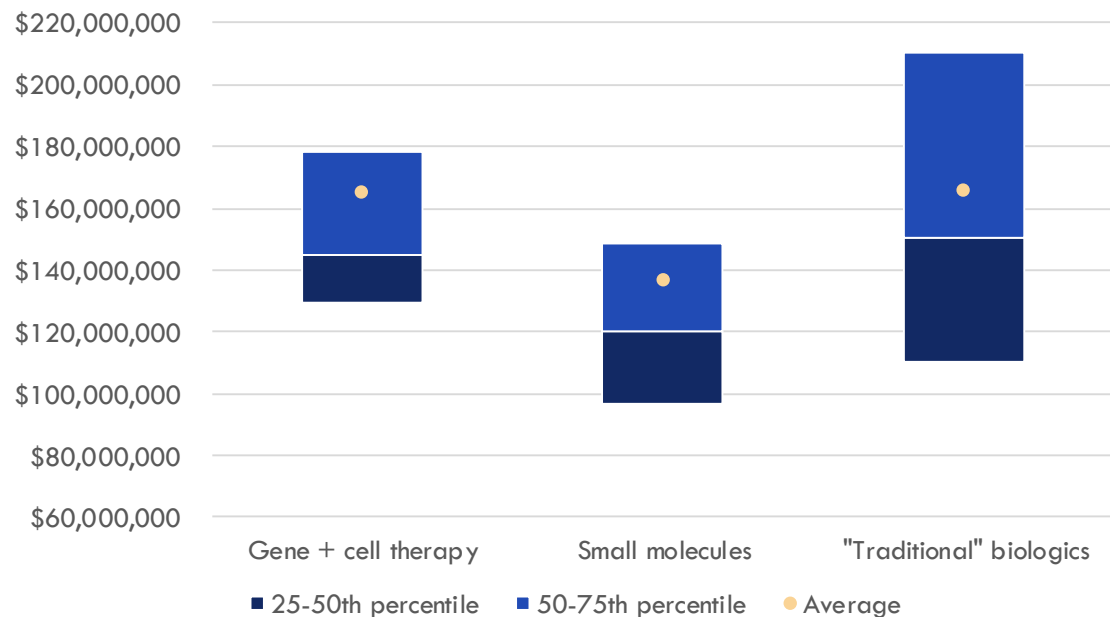
Source: Bay Bridge Bio, LLC, SEC filings, press releases, company websites

Some companies have multiple therapeutic areas; only most advanced development stage is shown

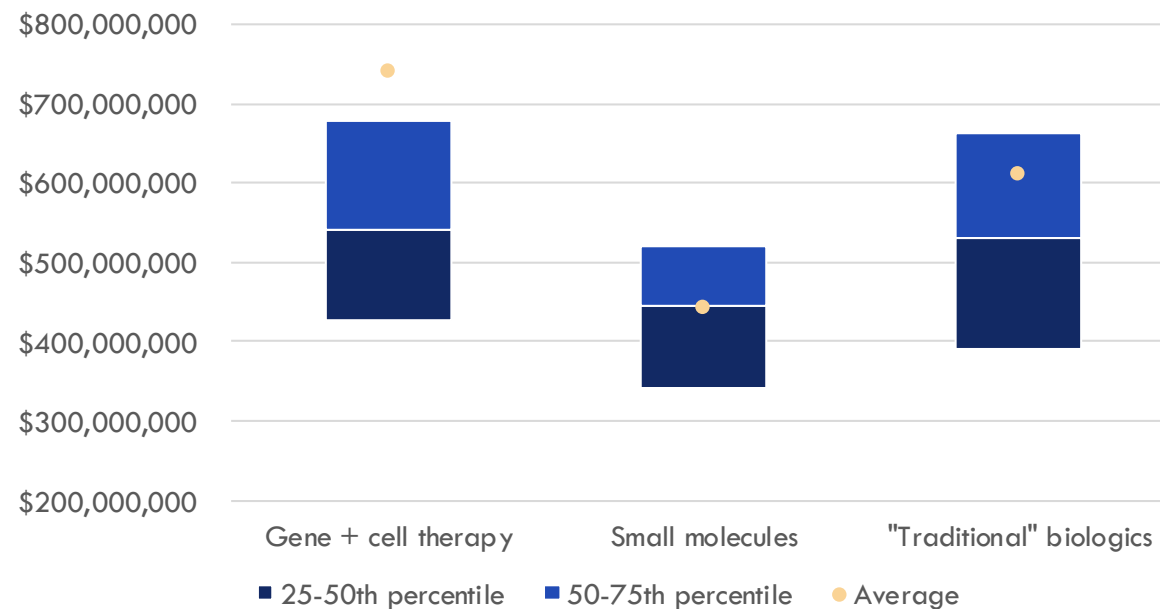
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Novel modalities command higher valuations

Capital invested through IPO by therapeutic modality



IPO post-money by therapeutic modality



Excludes BBIO

Source: Bay Bridge Bio, LLC, SEC filings, press releases, company websites

Which funds benefited most from recent IPOs?

An IPO is not always an exit: with IPOs just 3-4 years after Series A; investors can let returns season on public markets

Years from investment to IPO

	<i>From date of first tranche</i>		<i>From average date of tranches</i>		
	Average	Median	Average	Median	
Series A		3.7	3.2	3.2	2.7
Series B		2.1	1.7	1.9	1.3
Series C		1.2	0.7	1.1	0.6
Series D		1.7	0.6	1.7	0.6

Source: Bay Bridge Bio, LLC, SEC filings, press releases, company websites

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Total market value of investments in companies that went public

Fund name	at IPO price	at 6/30/2019 price	# of portfolio IPOs
Flagship Pioneering	\$2,933,735,489	\$1,893,007,665	5
Orbimed	\$1,101,206,654	\$1,501,855,498	14
Baker Bros. Advisors	\$717,462,809	\$633,215,603	5
Alta Partners	\$232,505,115	\$511,597,319	2
ARCH Venture Partners	\$484,345,443	\$498,055,601	5
Atlas Venture	\$463,662,762	\$367,557,531	8
5AM Ventures	\$272,049,434	\$352,900,363	4
F-Prime Capital Partners	\$419,881,972	\$352,469,704	5
Polaris Venture Partners	\$314,932,762	\$330,529,981	3
The Column Group	\$387,382,891	\$319,182,727	4
RiverVest	\$130,682,538	\$314,581,910	1
Sibling Capital	\$127,067,782	\$263,899,720	1
SR One	\$171,042,917	\$251,291,735	5
PureTech Health	\$261,832,305	\$245,639,896	2
Fidelity	\$344,584,502	\$243,669,494	8

Only includes data for companies where investors own 5%+ of common stock

Goldman, JPM and boutiques are top underwriters

Name	Total fees generated (\$M)	Total IPOs underwritten	Total left-lead bookrunner IPOs	\$s underwritten (\$M)	Return from investing in underwritten IPOs thru 6/30/2019 ¹
Goldman Sachs	\$84	22	15	\$1,239	14%
JP Morgan	\$78	20	14	\$1,144	10%
Cowen	\$54	24	2	\$768	4%
SVB Leerink	\$50	21	2	\$719	19%
Jefferies	\$50	23	12	\$742	24%
BofA Merrill Lynch	\$45	16	9	\$653	21%
Morgan Stanley	\$44	13	10	\$664	-30%
Citigroup	\$19	8	3	\$274	-4%
Evercore	\$19	10	0	\$272	13%
Piper Jaffray	\$14	9	0	\$212	0%

Investment banks have generated \$547M in fees from underwriting major VC-backed IPOs in 2018-1H2019

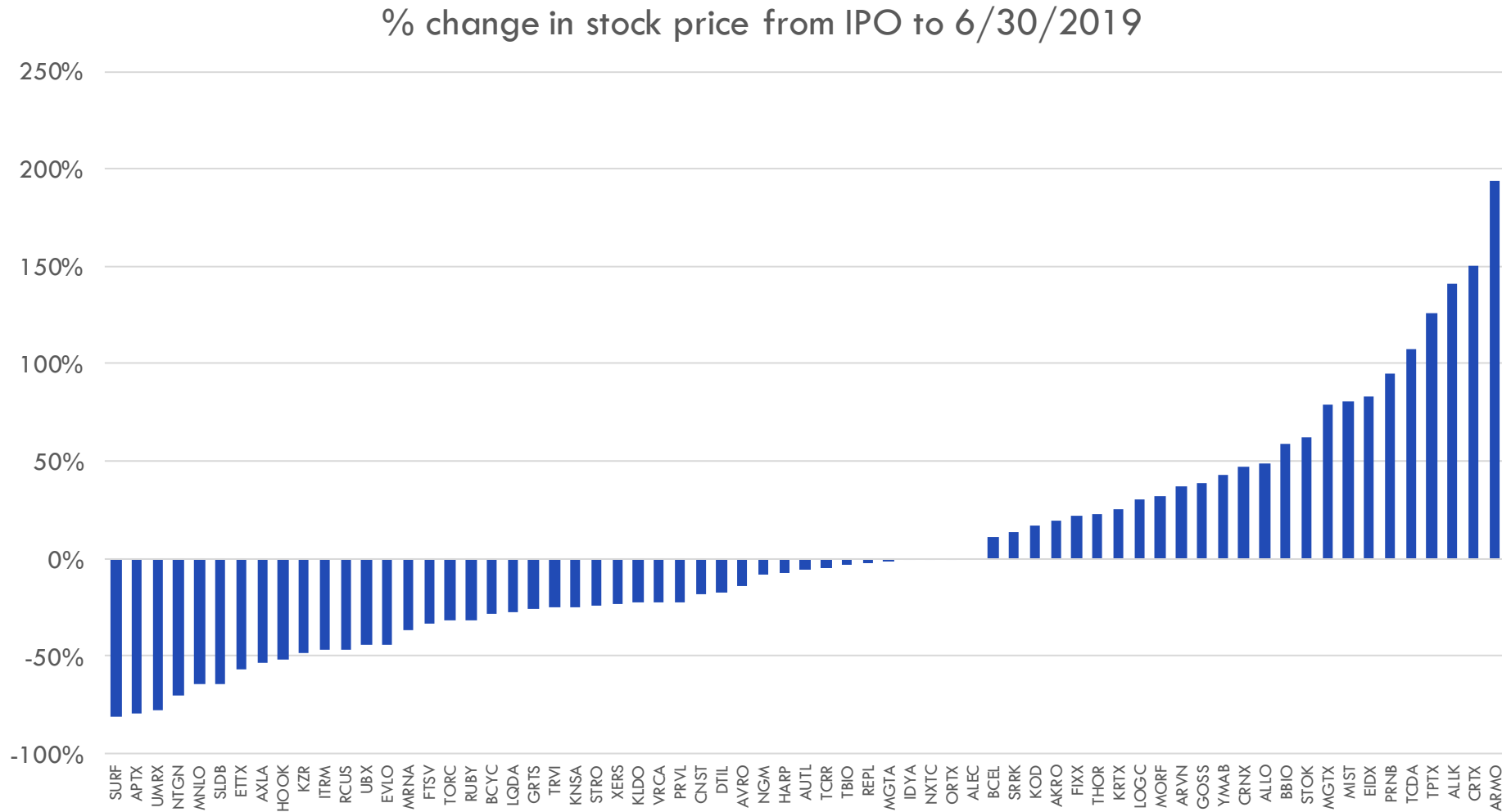
Life sci specialists Cowen and Leerink lead fewer deals, but get more fees than many bulge-bracket banks

All figures represent IPOs of VC-backed biopharma companies with proceeds of over \$50M from 1/1/2018-6/30/2019

¹ Represents change in share price from IPO to 6/30/2019 * dollars underwritten for each company / total dollars underwritten

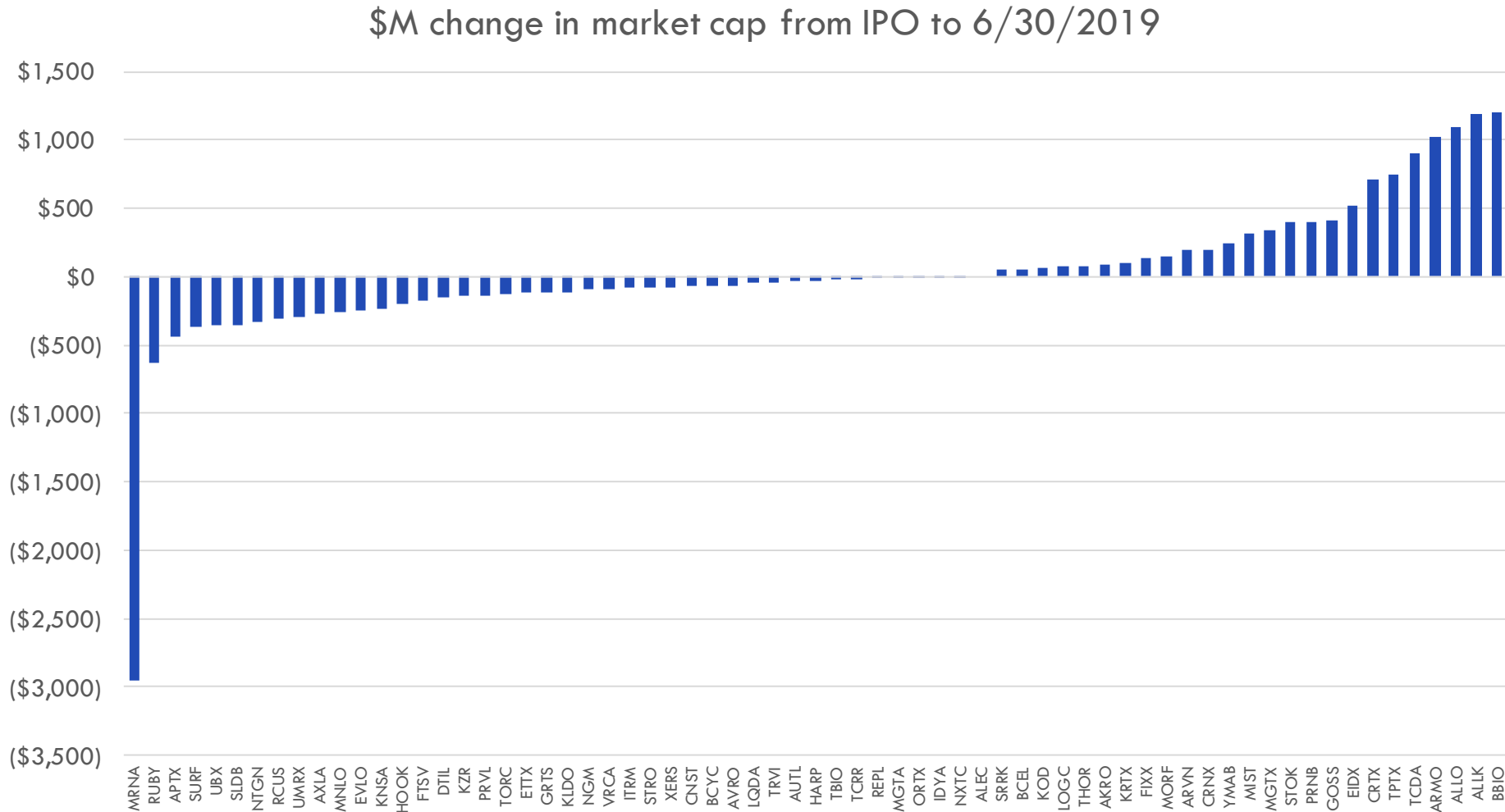
Source: Bay Bridge Bio, <https://www.baybridgebio.com/>

Wide distribution in % returns of IPOs



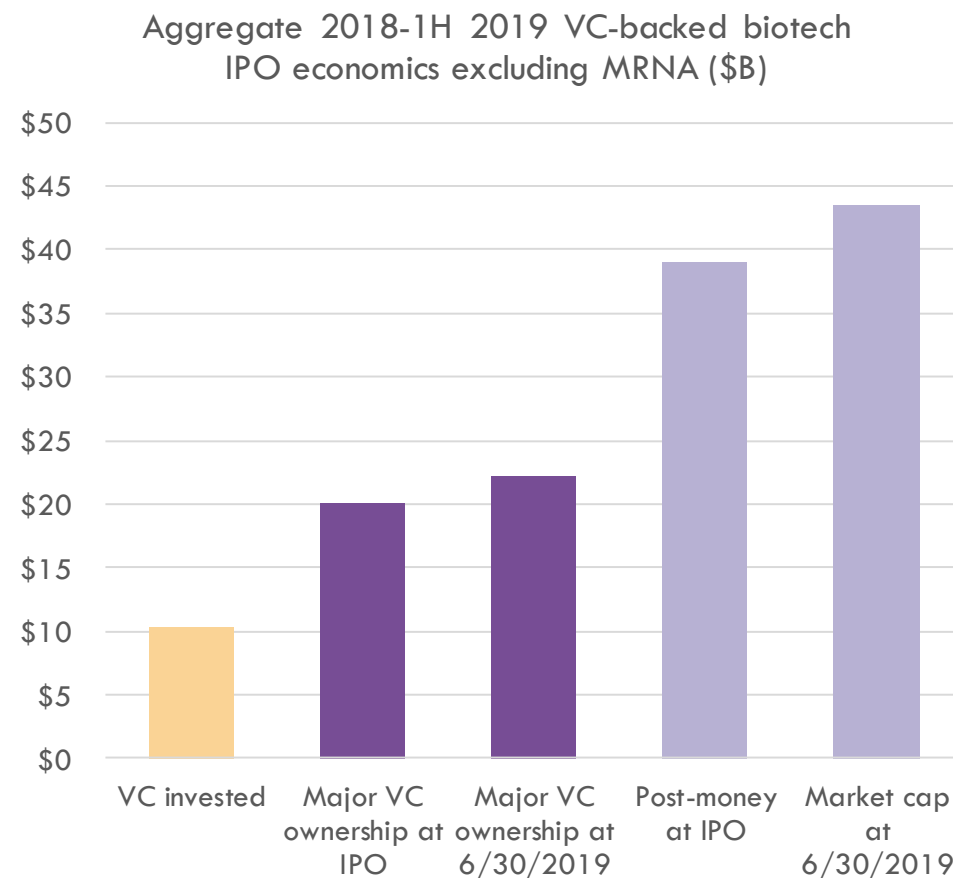
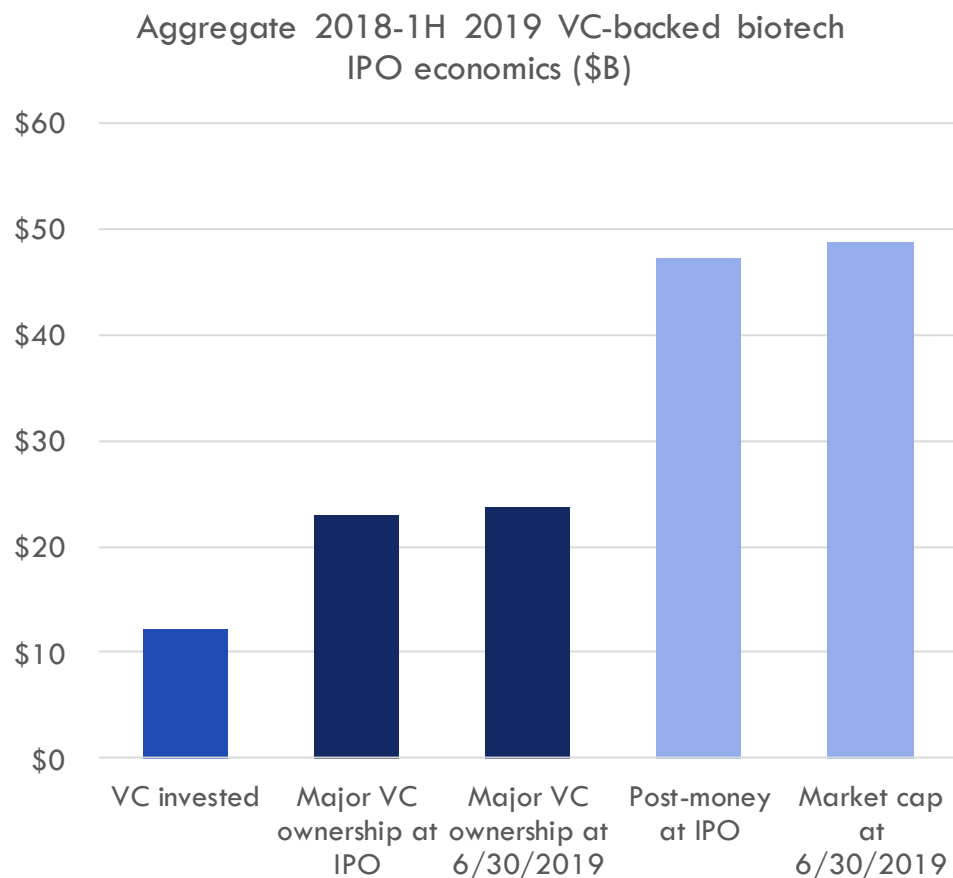
Source: Bay Bridge Bio, LLC, SEC filings, press releases, company websites; note that major VC ownership only includes investors owning 5% or more of outstanding stock, so understates total VC returns

Moderna \$ losses outweigh rest of sector gains



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Major VC-backed biotech IPOs outperform



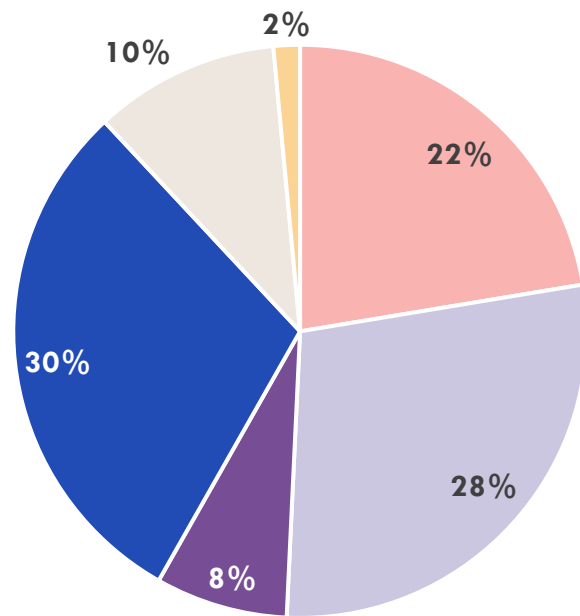
Excluding Moderna, major FY 2018-1H 2019 VC-backed IPOs as a market-cap-weighted class **returned 11% from IPO price to 6/30/2019**. VCs returned ~4x from venture investment to 6/30/2019.

Source: Bay Bridge Bio, LLC, SEC filings, press releases, company websites; note that major VC ownership only includes investors owning 5% or more of outstanding stock, so understates total VC returns

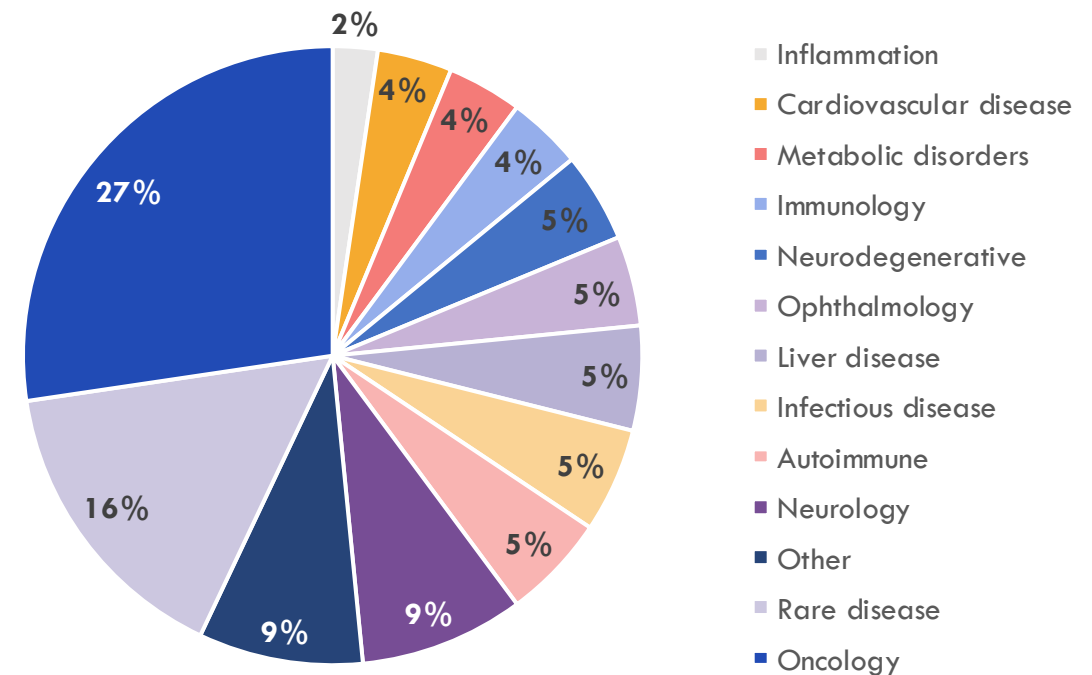
Phase 1-2, cancer and rare disease IPOs common

Development stage at IPO for 2018 VC backed IPOs over \$50M

Preclinical Phase 1 Phase 1/2 Phase 2 Phase 3 Commercial



Therapeutic area for VC backed IPOs over \$50M



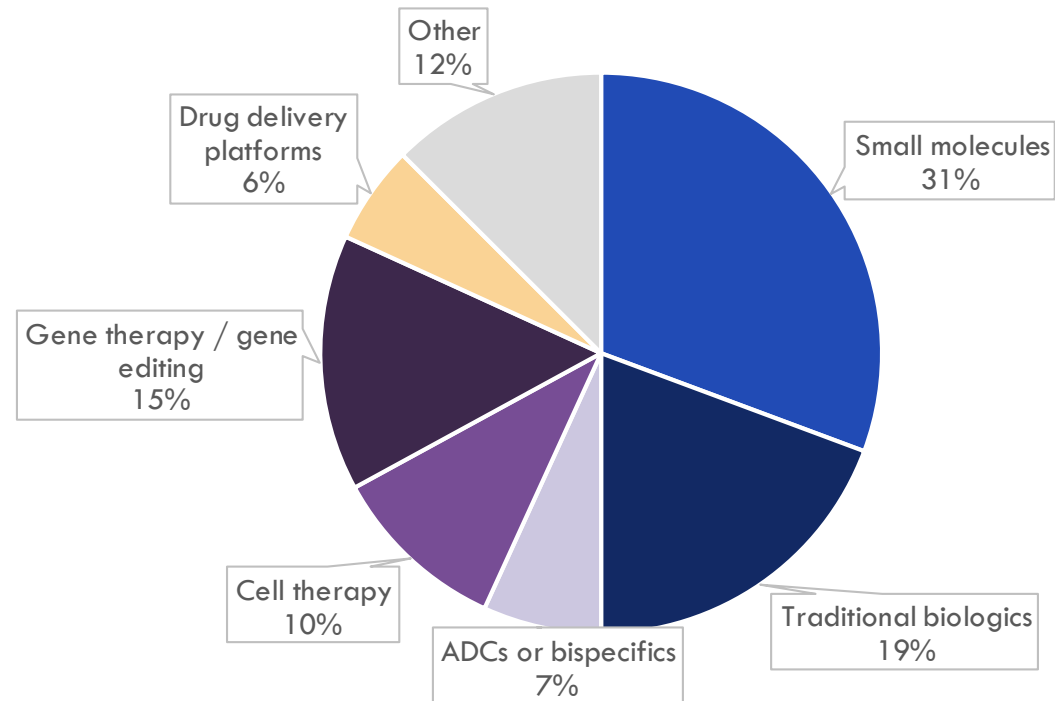
Source: Bay Bridge Bio, LLC, SEC filings, press releases, company websites

Some companies have multiple therapeutic areas; only most advanced development stage is shown

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Non-traditional modalities common in recent IPOs

Therapeutic modalities of VC-backed biopharma companies that IPO'd in 2018-1H 2019



Source: Bay Bridge Bio, LLC, SEC filings, press releases, company websites

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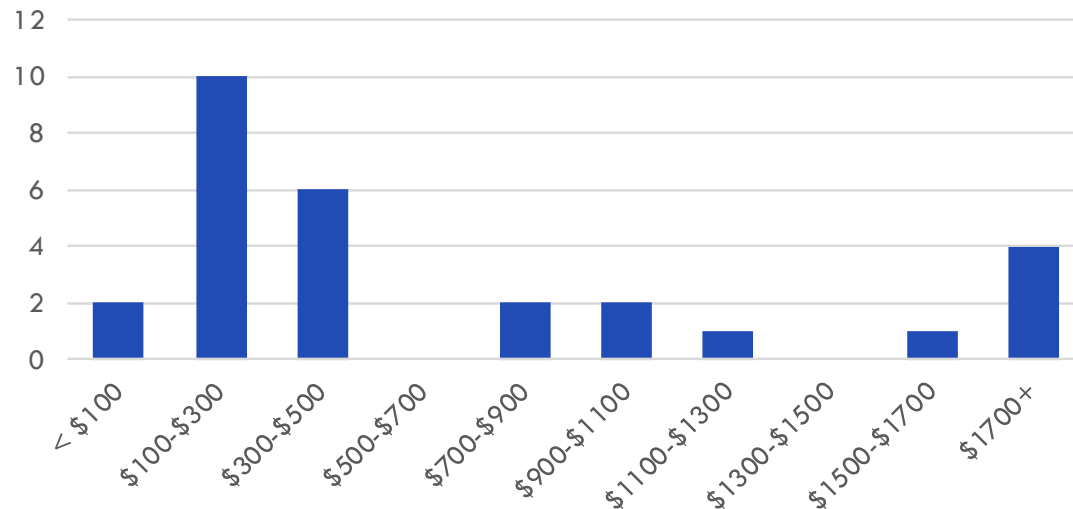
M&A market update

No signs that VC-backed M&A is returning to 2015 levels

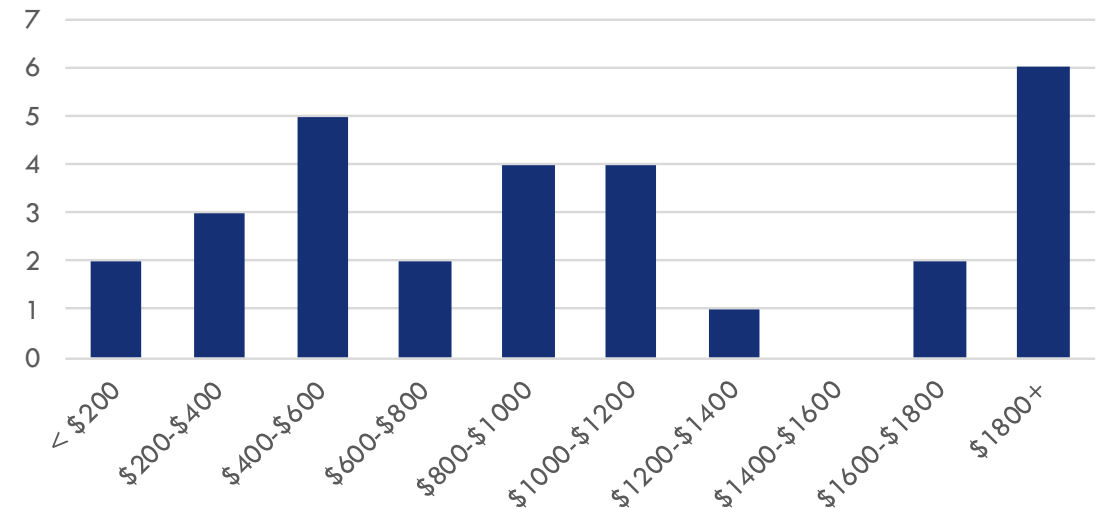
1H19 M&A volume below 1H18 but above 2H18

\$16.7B upfront / \$20.5B total in 1H 2019, vs. \$23.8B upfront / \$32B total M&A consideration in 1H 2018 and \$2.6B upfront / \$5.5B total for FY 2018

Number of VC-backed startups acquired by upfront consideration, FY 2018-1H 2019 (\$M)



Number of VC-backed startups acquired by total consideration (\$M)



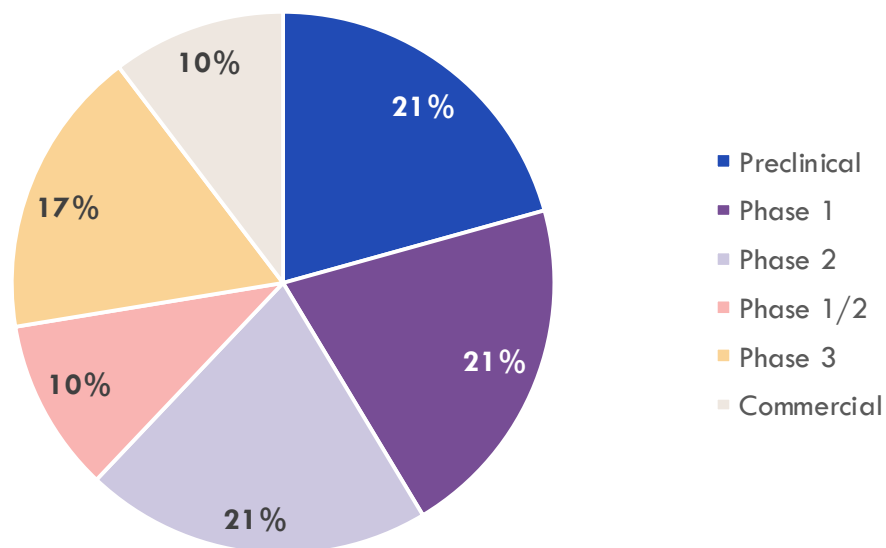
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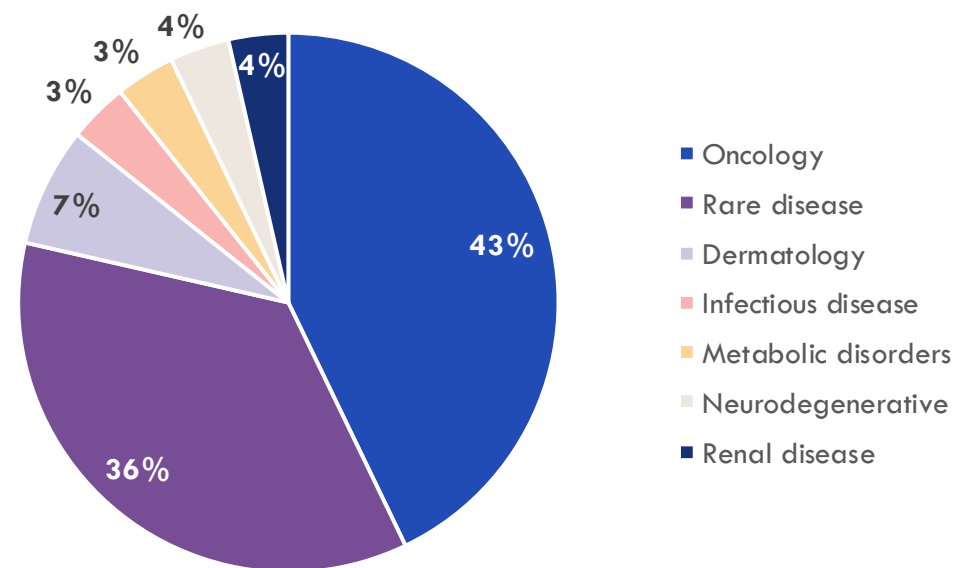
Oncology, rare disease primary M&A focus

In 2018, the only deals commanding \$500M+ upfront were pivotal / Phase 3 assets (including Juno and AveXis); in 1H 2019, there was one Phase 2 acquisition with upfront over \$500M (Peloton)

VC-backed M&A by development stage



VC-backed M&A by therapeutic area



VC-backed M&A includes biotech companies acquired for at least \$75M upfront that raised venture capital since 2013

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2H 2019 outlook and key questions

Will there be more mega-mergers?

The first half of 2019 began and ended with mega-mergers. In January, Bristol-Myers Squibb announced it was acquiring Celgene for \$74B. In June, AbbVie announced it would acquire Allergan for \$63B.

It's no secret that big pharma is still struggling to replace aging blockbusters. AbbVie exemplifies this phenomenon: in 2018, Humira generated \$19.9B in revenue for AbbVie, representing 61% of AbbVie's total 2018 revenue of \$32.7B. Humira's European patents recently expired, and its US patents will expire in 2023. Replacing \$20B in revenue is no easy task, and buying a huge company like Allergan is one way to do it (though many argue it's not the best way). Regeneron, Roche, Gilead, Amgen also rely on just a few products for a sizable portion of revenue. Other companies like Pfizer, Sanofi and GSK have less revenue concentration, but still get 10-20% of revenue from one or two products.

From 2013 to 2015, big pharma companies aggressively acquired startups in an effort to bolster their product pipelines and replace revenue from off-patent blockbusters. But pharma has been acquiring fewer startups from 2016 onward, opting for other strategies to fill its pipelines: internal R&D, larger M&A, or development collaborations with startups. If big pharma companies continue to opt for large M&A rather than buying startups, that will potentially negatively impact the IPO and VC market.

Many speculate that large biotechs like Biogen, BioMarin, Alexion or even Gilead are attractive acquisition candidates for big pharma companies like Merck or J&J. Acquisitions of this size would transform the pharma landscape, further consolidating power in the hands of a few big companies. With fewer potential buyers, startups would have less leverage and potentially command lower valuations.

2H 2019 outlook and key questions

Gene and cell therapy pricing

Novartis made headlines in May when it announced its \$2.1M price tag for its gene therapy Zolgensma, making it the most expensive drug in the world. Zolgensma is designed to be a “one-shot” therapy with curative potential (patients typically develop an immune response to the viruses that deliver gene therapies after one injection, making multiple injections impossible).

The drug has shown incredible results in clinical studies, potentially curing Type 1 Spinal Muscular Atrophy (SMA), a disease that would otherwise kill almost 90% of affected infants before age 2. But no one knows how long the effect will last or what the longer term health outcomes will be.

The \$2.1M price tag is considered higher than the acceptable cost-effectiveness threshold. However, another therapy for SMA, Biogen’s Spinraza, is deemed to be even less cost-effective than Zolgensma. Nevertheless, it is an incredibly successful drug, generating over \$800M in sales in its first year on the market.

Whether Zolgensma will succeed with a \$2.1M price tag is a very important issue. Gene and cell therapies hold tremendous promise, and the industry is increasingly betting on these technologies to build the drugs of the future (as evidenced by the acquisitions of Kite, Gilead, AveXis, Spark and others). But these drugs are incredibly expensive to develop and manufacture – AveXis spent over \$700M getting Zolgensma to market – and most gene and cell therapy launches to date have been underwhelming.

If Zolgensma is a flop, it might put a damper on the whole gene and cell therapy field. If it is successful, we may see yet more M&A and investment in this space.

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About Bay Bridge Bio

Bay Bridge Bio supports the next generation of biopharma entrepreneurs. We connect talented PhD students and postdocs from leading research institutions with top-tier biopharma investors and entrepreneurs to learn about the world of biopharma, build relationships, find jobs, and start companies.

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