



# Q1 2026 Biopharma Market Update

April 7, 2026

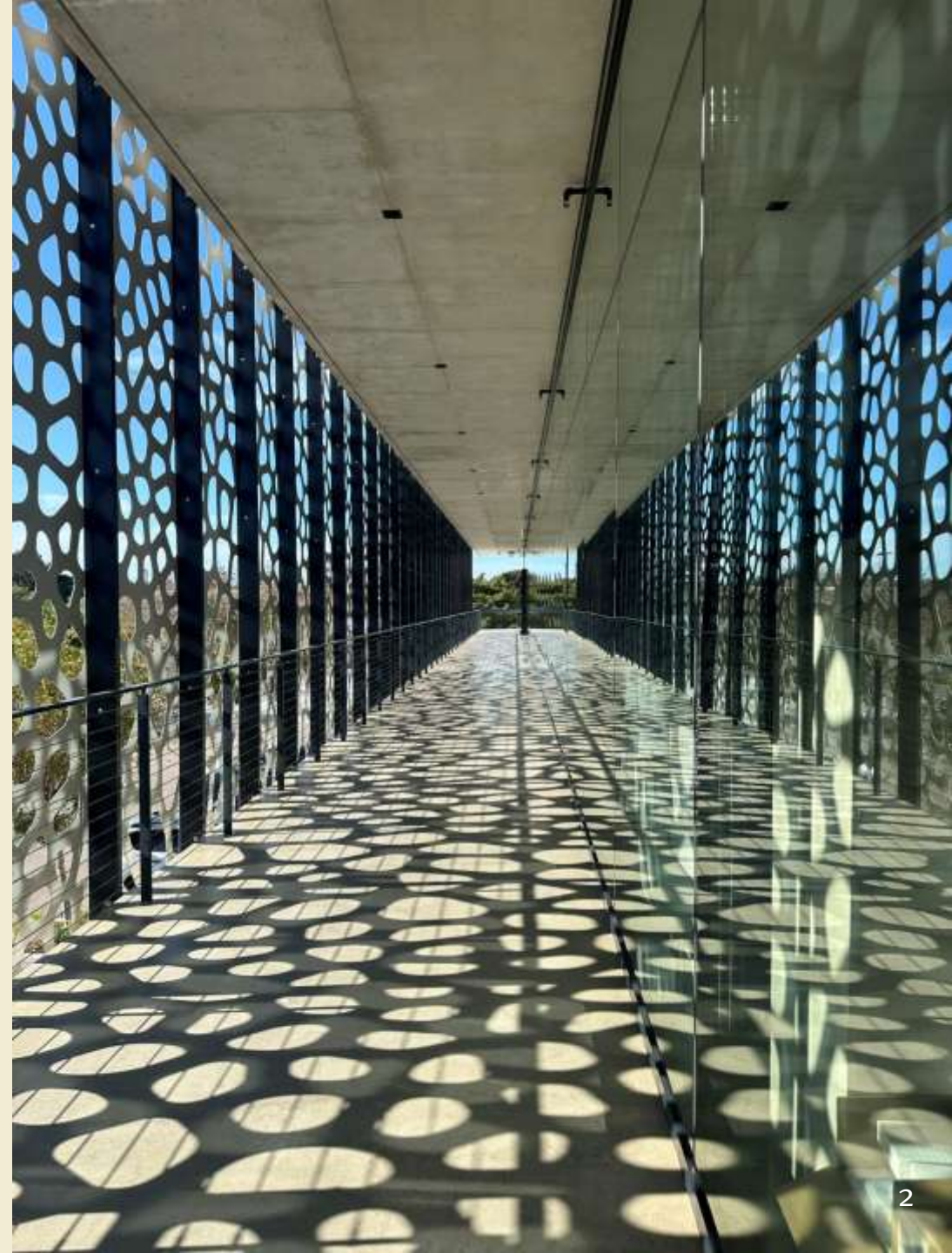
Spring Floral Display, Hibiya City, Tokyo, March 2026

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Walkway in home of many biotechs in San Diego (9880 Campus Point Drive), February 2026.



# Past Issues

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Element on cabinet designed by Julia Morgan, Berkeley City Club, February 2026



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# Geopolitical Situation Report

Complex Swirls in Stone with Crevasse, Tennessee Beach, Marin Headlands, March 2026



# Iran Dismisses Cease-Fire Bid Ahead of Trump's Tuesday Deadline

*Wall Street Journal, April 6, 2026 (excerpt)*

Iran rejected a U.S. plan to end the war, issuing its own 10-point response via Pakistan, according to a state news agency. President Trump said he had seen Tehran's counterproposal and it's "not good enough" for a cease-fire, though he called it "a significant step." Trump is set to hold a press conference Monday at 1 p.m. ET, and earlier said in an interview with The Wall Street Journal that Iran "won't have any power plants and they won't have any bridges standing" if a deal to reopen the Strait of Hormuz isn't reached by Tuesday evening.

Source: <https://www.wsj.com/livecoverage/iran-war-latest-news-updates-2026>

# S&P 500 rises as investors await possible Iran and U.S. ceasefire

*Marketwatch, April 6, 2026 (excerpt)*

The S&P 500 rose on Monday following a winning week as oil prices seesawed, with traders weighing the odds that the U.S.-Iran war could end soon. The broad market index ticked up 0.3%, while the Nasdaq Composite gained 0.4%. The Dow Jones Industrial Average climbed 100 points, or 0.2%.

Axios reported that the U.S., Iran, and a group of regional mediators were discussing terms for a potential 45-day ceasefire that could lead to a permanent end to the war, though the chances for reaching a partial deal before the Tuesday deadline were slim. To be sure, a 45-day ceasefire is just one of the many ideas being floated.

Source: <https://www.cnbc.com/2026/04/05/stock-market-today-live-updates.html>

# How Trump Boxed Himself In on Iran

David Sanger, *New York Times*, April 2, 2026 (excerpt)

More than a month into a war that he insists will come to an end within two or three weeks, President Trump has put himself in a strategic box from which he is finding no easy exit.

Talks with Iran about a deal to end the conflict, to the degree they are substantive, have so far shown little promise. The key metrics of success described at various points by Mr. Trump — keeping Iran from possessing the fuel to make a nuclear weapon, helping the Iranian people topple a government much of the populace despises and reopening the Strait of Hormuz — remain in the distance, at best.

Iran's tolerance for pain appears far higher than Mr. Trump anticipated, and despite devastating losses to its arsenal, it retains some ability to strike Israel with missiles. It did so even while Mr. Trump spoke about the war on Wednesday evening.

That televised, prime-time address was intended to reassure Americans that the costs of the war would be transitory, that an end to hostilities and a return to normal economic life were imminent. But the markets responded to his speech with deep skepticism.

Oil prices surged 8 percent in the hours after his 19-minute address, largely because he described no plan to end what amounts to a tanker hostage crisis in the Strait of Hormuz that is now rippling across the global economy. The strait, he insisted, would “open up naturally” when the conflict is over.

# Trump Says Strait of Hormuz is the World's Problem: 'Go Get Your Own Oil!'

Gregory Svirnovkiy, *Politico*, March 31, 2026 (excerpt)

President Donald Trump had a message Tuesday for U.S. allies whose access to oil has been imperiled by the White House's war against Iran: You're on your own.

"All of those countries that can't get jet fuel because of the Strait of Hormuz, like the United Kingdom, which refused to get involved in the decapitation of Iran, I have a suggestion for you: Number 1, buy from the U.S., we have plenty, and Number 2, build up some delayed courage, go to the Strait, and just TAKE IT," he wrote on Truth Social Tuesday.

But NATO partners, including the European Union, have largely refused to help secure the strait. "This is not Europe's war," Kaja Kallas, the EU's top diplomat, said earlier in March.

"You'll have to start learning how to fight for yourself, the U.S.A. won't be there to help you anymore, just like you weren't there for us," he wrote Tuesday. "Iran has been, essentially, decimated. The hard part is done. Go get your own oil!"



# Why America's Hard-Power Military Might Isn't Ending the Iran War

Stephen Collinson, *CNN*, March 31, 2026 (excerpt)

Donald Trump is fond of telling Ukraine it has no cards in its attritional war with Russia. But the US president is facing growing questions about the strength of his own deck in the war with Iran.

Superficially, the United States, with more than three times Iran's population and the world's most powerful military and economy, has an overwhelming edge in the balance of power. Add in Israel's tested military and all-seeing intelligence machine and it seems an unfair fight.

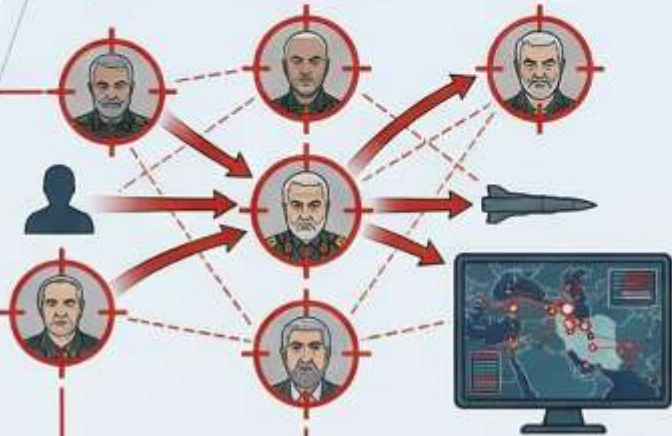
But Iran — by turning its few areas of advantage into painful pressure points for the US, and by forcing its repressed people to absorb massive punishment — has done more than survive. Some analysts believe it has seized the strategic initiative.

Iran can't defeat the US and Israel, but it played its ultimate trump card by closing the Strait of Hormuz, a major energy exporting choke point, thereby holding the global economy hostage and building political costs for the US.



# TIMELINE OF THE CURRENT IRAN CONFLICT

## DECAPITATION STRIKES



DAY 1-5

MONTH 1

MONTH 1

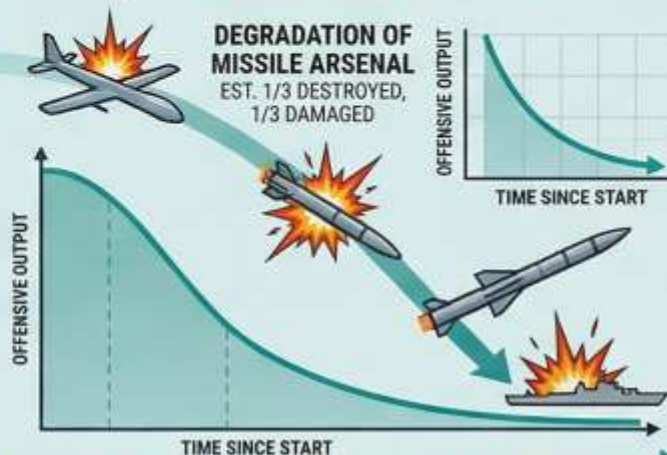
**INITIAL HIGH-LEVEL LEADER ASSASSINATIONS**  
e.g., Senior Quds Force Commanders, such as, key political figures

**TARGETED COMMAND STRUCTURAL COLLAPSE**

**CONTINUED PRECISION ENGAGEMENTS**



## REDUCTION IN IRANIAN OFFENSIVE CAPABILITIES



WEEK 1

WEEK 2

WEEK 3

**DESTRUCTION OF DRONE PRODUCTION FACILITIES**

**SUPPRESSION OF LAUNCH SITES**

**NAVAL FORCE LOSSES**  
e.g.: frigates, fast attack craft



## SHUTTING OF THE STRAIT OF HORMUZ



WEEK 2

WEEK 3

WEEK 4

**IRAN DECLARES STRAIT CLOSED**  
IRGC WARNINGS TO VESSEL TRANSIT

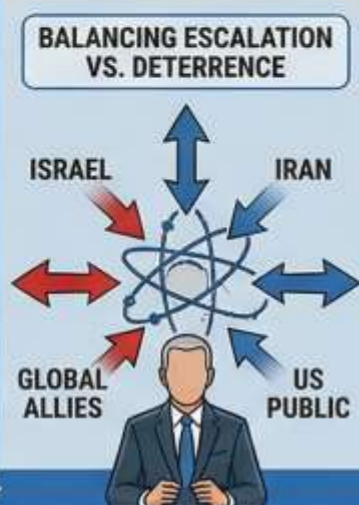
**GLOBAL SHIPPING REROUTED**

**ENERGY SUPPLY SHOCK & PRICE SPIKE**  
(for oil, and lved, oil/LNG)



**REGIONAL FORCE MAJEURE DECLARATIONS**  
(FOR OIL/LNG)

## 4. THE U.S. DIFFICULT POSITION



- BALANCING ESCALATION VS. DETERRENCE
- STRAINED MILITARY STOCKPILES (INTERCEPTORS & MUNITIONS)
- GLOBAL ECONOMIC PRESSURE (OIL/INFLATION)
- INTENSE INTERNATIONAL DIPLOMACY & SANCTIONS SNAPBACK
- DOMESTIC POLITICAL UNREST & HUMANITARIAN CONCERNS

# While Market Dropped Last Week, Potential for Things To Worsen as World Hits an Oil Cliff in Mid-April

Matt Peterson, *CNBC*, March 28, 2026 (excerpt)

Markets have deteriorated over the past few days. The S&P 500 rose half a percent on Tuesday amid optimism that Trump would delay a plan to attack Iranian energy infrastructure, but proceeded to fall 3.4% from Wednesday through Friday's close. The yield on the 10-year Treasury note has followed a similar trajectory. It has now risen by roughly a half-point over the course of the war to 4.4%, reflecting worries about inflation and the prospect that the Fed may not cut interest rates as it has hoped to do.

The looming possibility of physical supply shortages in the oil market appears to be blunting the effect of Trump's jawboning. Financial markets reflect the reality that Trump has often managed to avoid worst-case scenarios, including when he attacked Iran's nuclear program in June. Oil futures then spiked but quickly fell once it was clear the war wouldn't spread.

Geopolitical strategist Marko Papic with markets advisory firm BCA Research pulled together an estimate of the sources of supply and their blockages. For now through roughly April 19, Papic estimates the world has lost 4.5-5 million barrels a day of oil from the war, amounting to about 5% of global supply. But, he writes in a research note sent out this week, "that number will double by mid-April, becoming the largest loss of crude supply."

The world will hit an oil cliff in mid-April, in Papic's estimation, because supplies from the strategic petroleum reserve as well as Russian and Iranian oil exempted from sanctions will run out. There is no substitute for pumping oil from the ground and sending it directly to clients.



Source: <https://www.cnbc.com/2026/03/28/oil-gas-prices-iran-war-hormuz.html>

# Is Iran a Political Problem for Trump? Tell Me How Long the War Lasts

**Nate Cohn, *New York Times*, March 28, 2026 (excerpt)**

After nearly one month at war with Iran, President Trump's standing with the public seems mostly steady. On one hand, his approval rating hasn't gone up: There certainly isn't the usual "rally around the flag" effect that has benefited other presidents in the opening stages of military conflicts. Instead, Mr. Trump's approval rating has fallen to 40 percent, according to our average. That's a weak number under any circumstance, but it's especially poor during what might ordinarily be a galvanizing moment for the country.

On the other hand, his ratings haven't collapsed. They've fallen only by a percentage point or two, and some may be wondering why he hasn't taken a bigger hit. After all, the military campaign goes against Mr. Trump's "no new wars" promise, and it has divided some MAGA conservatives. For good measure, the polls show that a majority of the public opposes the war.

From that perspective, the war might look like the latest example of Mr. Trump's political resiliency. He's largely unscathed — again. But if you think he's insulated from any political consequence from the war, that would be going too far. **There are enormous downside risks to his presidency if the war goes on.** Of course, a geopolitical and economic catastrophe is far from inevitable; Mr. Trump could declare victory and end the war tomorrow. But if it persists indefinitely? He's survived a lot over the years, but a protracted war combined with economic dissatisfaction is a far different challenge. Historically, quagmire abroad and high prices at home are the ingredients of a failed presidency.

But while negotiations or promises can make it sound as if the war will soon be over, it's also possible to imagine a more protracted conflict. It's happened before. While the president has talked about talks, there's no clear endgame in sight, and many presidents have chosen escalation before accepting defeat. There are plausible escalatory steps, like seizing Kharg Island. And even without escalation, protracted negotiations and a drawn-out conflict could increase gas prices and strain the economy.

This is a politically toxic combination. **Historically, high gas prices or a weak economy can do enormous damage to presidential approval.** The same can be said for a foreign policy quagmire, whether it's the Iraq war or the Iran hostage crisis. When the two go together, it can end in political catastrophe. Harry Truman (Korea), Jimmy Carter (Iran) and George W. Bush (Iraq) saw their approval ratings sink into the 20s with the combination of a foreign policy nightmare and high prices.

# 432 days into Donald Trump's term

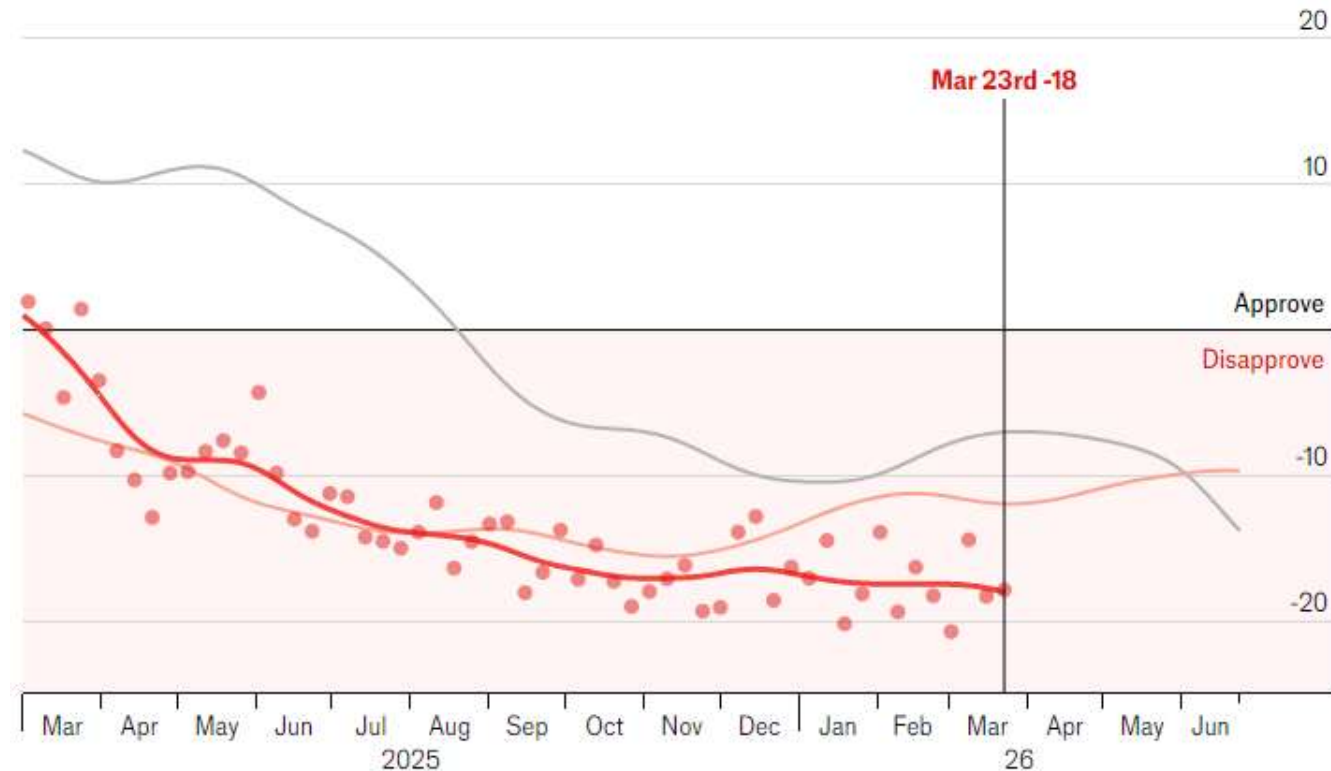
The president's net approval rating is **-18**,  
down **0.3** points since last week.

**38%** approve, **56%** disapprove, **6%** not sure

Source: Economist, March 28, 2026

Last updated on March 28th 2026

Net approval rating, % points  
Compared with — Trump 2017 — Biden 2021



We have previously argued that a central feature of President Trump's efforts in 2026 will be to enhance his electoral popularity in order to maintain both houses of Congress in the November 2026 mid-term elections.

It is our belief that one important reason to attack Iran was to score a win that would bolster his approval rating well before voting begins in the election. Thus far, this gambit has not played out and Trump finds himself in a challenging electoral situation. The Iranians are in no rush to sue for peace. Moreover, by blocking the Strait of Hormuz, Iran is able to create pressure on Trump by pushing up oil prices which creates inflationary pressure at home.

The latest statistics, shown at left, indicate that, if anything, Trump's approval numbers are *dropping* rather than increasing after the U.S. attack on Iran. Presumably, there is still room for this to be reversed with some sort of peace agreement where both sides can claim victory. But this appears increasingly unlikely in the near term.

We see the current political situation as potentially dangerous as President Trump could be tempted to double down on risk-taking in order to reverse his drop in popularity (see slides on Iran conflict and game theory ahead). This is a near-term exigency and would appear to create potential for incremental global volatility. At the moment, President Trump's approach to the pharmaceutical industry has been benign relative to actions taken last year. We fear that this might change, particularly if there is a landslide for Democrats this Fall at the polling booth as one area where both parties agree is to take on pharmaceutical industry pricing.

# Trump Facing a Loss of Support Among Non-MAGA Republicans and Independents

**Martha McHardy, *The Daily Beast*, March 26, 2026 (excerpt)**

President Donald Trump's approval rating has fallen to a new low in a devastating Fox News poll, with even parts of his own party beginning to drift away.

The poll, conducted March 20-23 among 1,001 registered voters, shows that just 41 percent of registered voters approve of Trump's job performance, while 59 percent said they disapprove—the highest disapproval rating of either of his two terms. Nearly half of voters, 47 percent, said they strongly disapprove.

The slide marks a sharp deterioration from a year ago, when Trump's standing was nearly even at 49 percent approval to 51 percent disapproval.

What makes the latest results especially striking is the erosion inside the GOP. Trump's approval among Republicans dropped to 84 percent, his lowest level of the second term, down from 92 percent last March. The softening appears to be driven largely by non-MAGA Republicans, whose approval of Trump fell 11 points over the past year, from 70 percent to 59 percent.

**Howard Koplowitz, *AL.COM*, March 30, 2026:** President Donald Trump's approval rating now matches an all-time low since he's been president, according to a new poll that shows him deeply underwater on every key issue. Only 33% of respondents in the University of Massachusetts Amherst Poll approve of how Trump is handling his job. A strong majority, 62%, disapprove of Trump.

## 'Brutal' New Poll has Trump at Lowest Point Ever as 2024 Coalition Shows Signs of Cracking

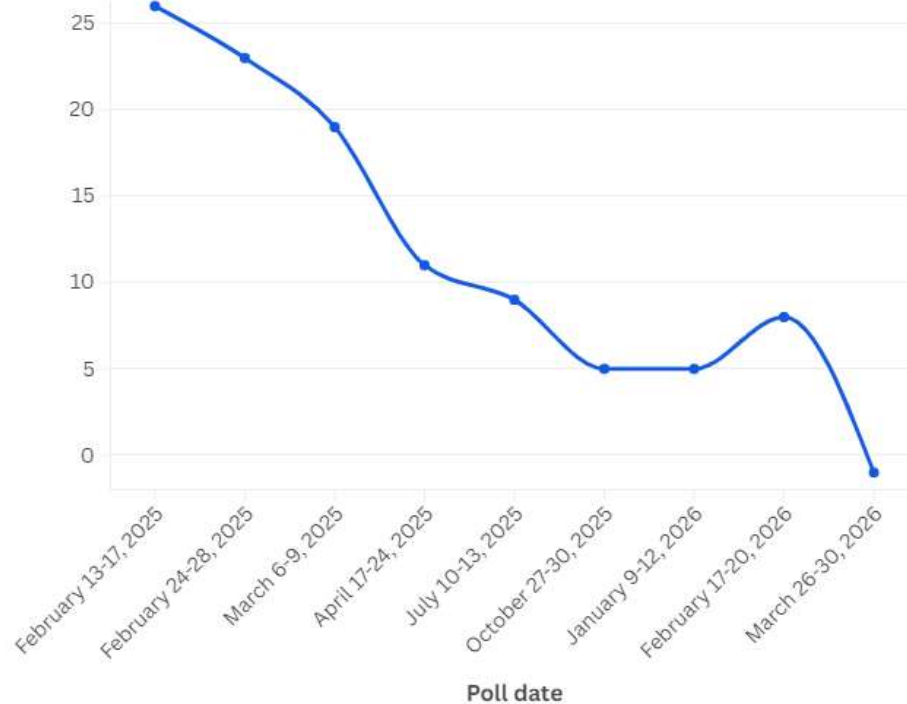


# Republicans and White Non-College Voters Less Supportive of President Trump Than Before

Newsweek, April 3, 2026

## Trump's Approval Among White, Non-College Educated Voters

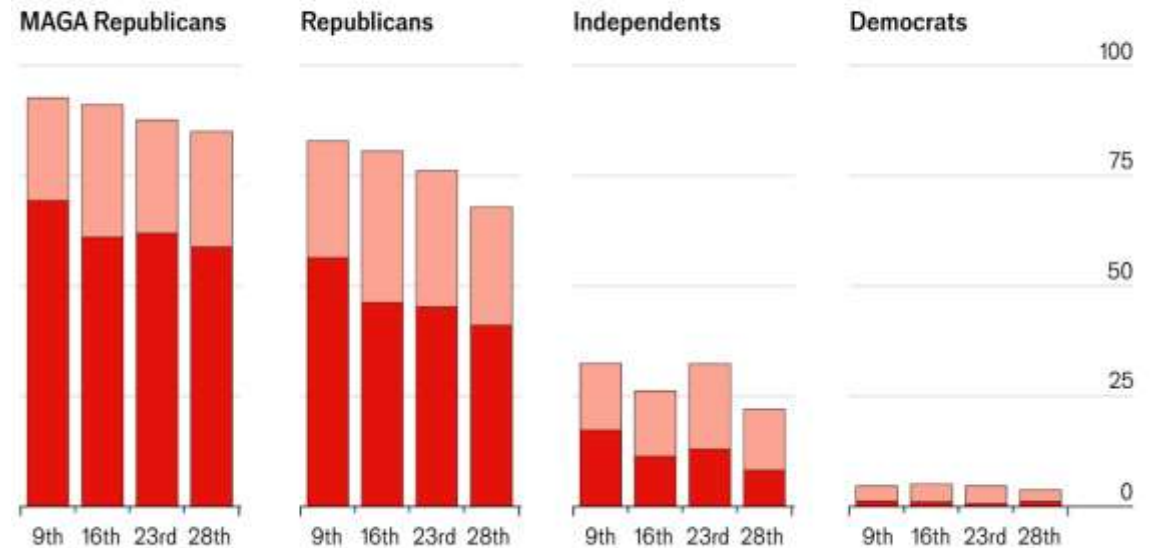
Trump's net approval rating (%)



Economist, April 3, 2026

Approval of Trump's handling of Iran, March 2026, %

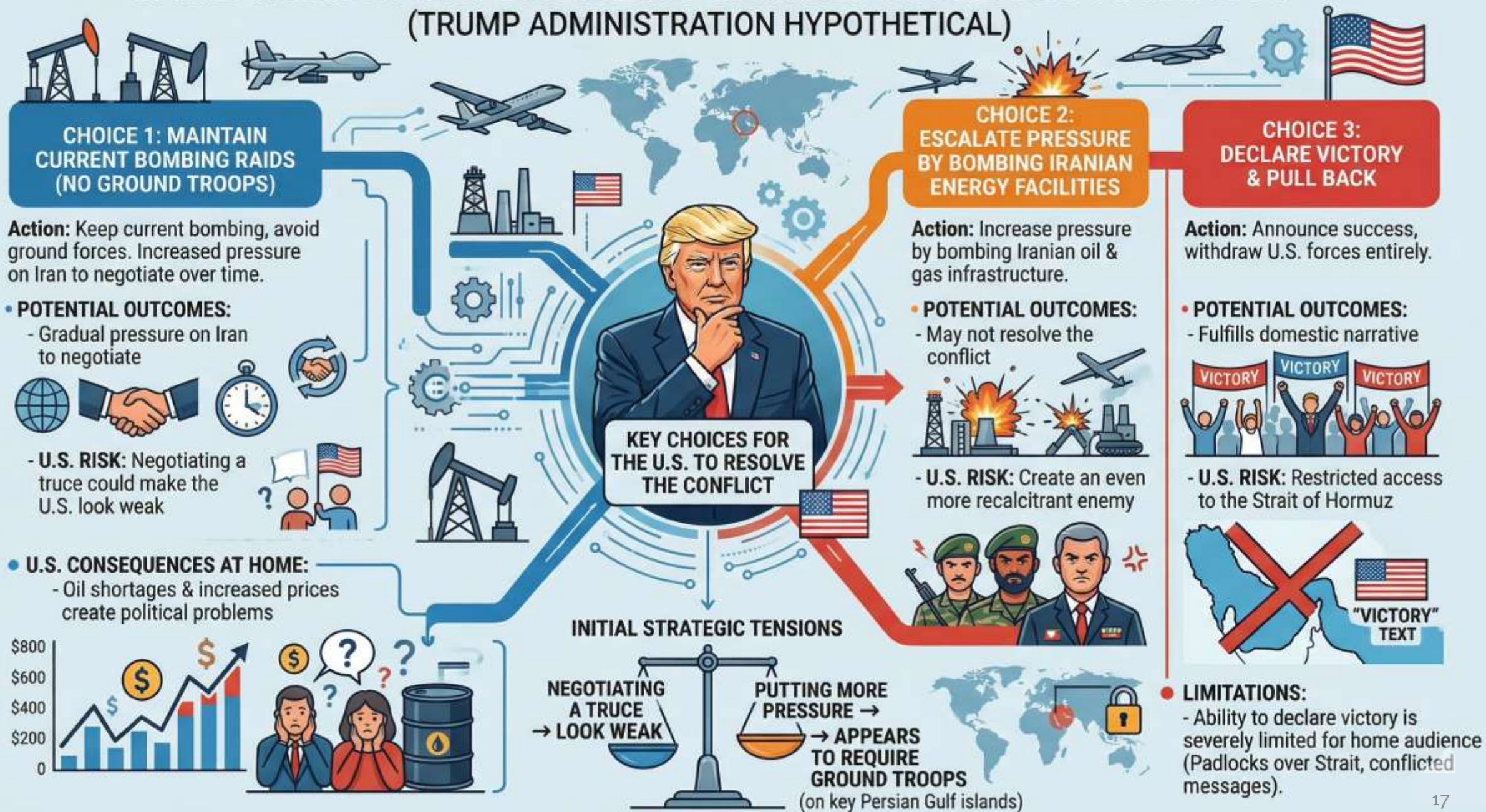
Somewhat approve Strongly approve



Source: YouGov/The Economist

# GAME THEORY: U.S. STRATEGIC CHOICES IN THE IRAN CONFLICT

## (TRUMP ADMINISTRATION HYPOTHETICAL)



# It Seems Like the Trump Administration is Going for Choice #3: Declare Victory and Pull Back

With an upcoming election and dropping approval numbers, President Trump appears to want the Iran conflict ended soon. He may be in an untenable domestic political situation and needs to get the electorate focused on other issues that will work to his advantage. Soon.

The main issue is what happens with a closed Strait of Hormuz and the effects on the global economy. While signaling withdrawal from the conflict, President Trump appears to be trying to maximize leverage to encourage the Iranians to reopen the Hormuz Strait through some type of negotiation process.

It's not obvious that this is going to happen, but it appears that the Trump Administration feels that its alternatives are not better.

## *New York Times Dealbook, April 1, 2026 (excerpt)*

Markets are largely breathing a sigh of relief this morning, as investors took hope that President Trump was preparing to wind down U.S. strikes on Iran within — by his estimation — “two weeks, maybe three.”

But political and business leaders around the world continue to worry that the long-term consequences of the fighting and a potentially sudden end to U.S. operations may last a lot longer.

Trump signaled that he wanted to wrap up the fighting. “We will be leaving very soon,” he told reporters on Tuesday, and the administration said he would address the nation tonight. Secretary of State Marco Rubio also suggested that Washington was close to achieving a key goal: preventing Tehran from being able to build a nuclear weapon. “We can see the finish line,” Rubio said on Fox News.

Source: <https://www.nytimes.com/2026/04/01/business/dealbook/markets-war-iran-trump.html>

# Nasdaq Leads Rally Built on Hope the Iran War May End Soon

*Wall Street Journal, March 31, 2026 (excerpt)*

Stocks jumped to their biggest one-day gains in 10 months after President Trump told aides that he's willing to end the war without fully reopening the Strait of Hormuz.

The Nasdaq composite led with a 3.8% rise, the latest bump coming after reports that Iran's president was open to ending the war; the Dow industrials advanced 2.5%, or 1,125 points, while the S&P 500 jumped 2.9%. It was the biggest one-day gain since May 2025 for the three benchmarks.

Investors appeared to welcome Trump's stance as a sign that the current phase of the war would wind down soon. However, the trajectory of the conflict, and its implications for global markets, are far from certain.

“Markets rallied on the comments, though nothing has been formally confirmed,” wrote Stephanie Link, chief investment strategist and head of investment solutions at Hightower. “It speaks to the oversold condition in the stock market, but also to the fact that if it is a short war, we can all go back to focusing on fundamentals.”

Source: <https://www.wsj.com/livecoverage/stock-market-today-dow-sp-500-nasdaq-03-31-2026>



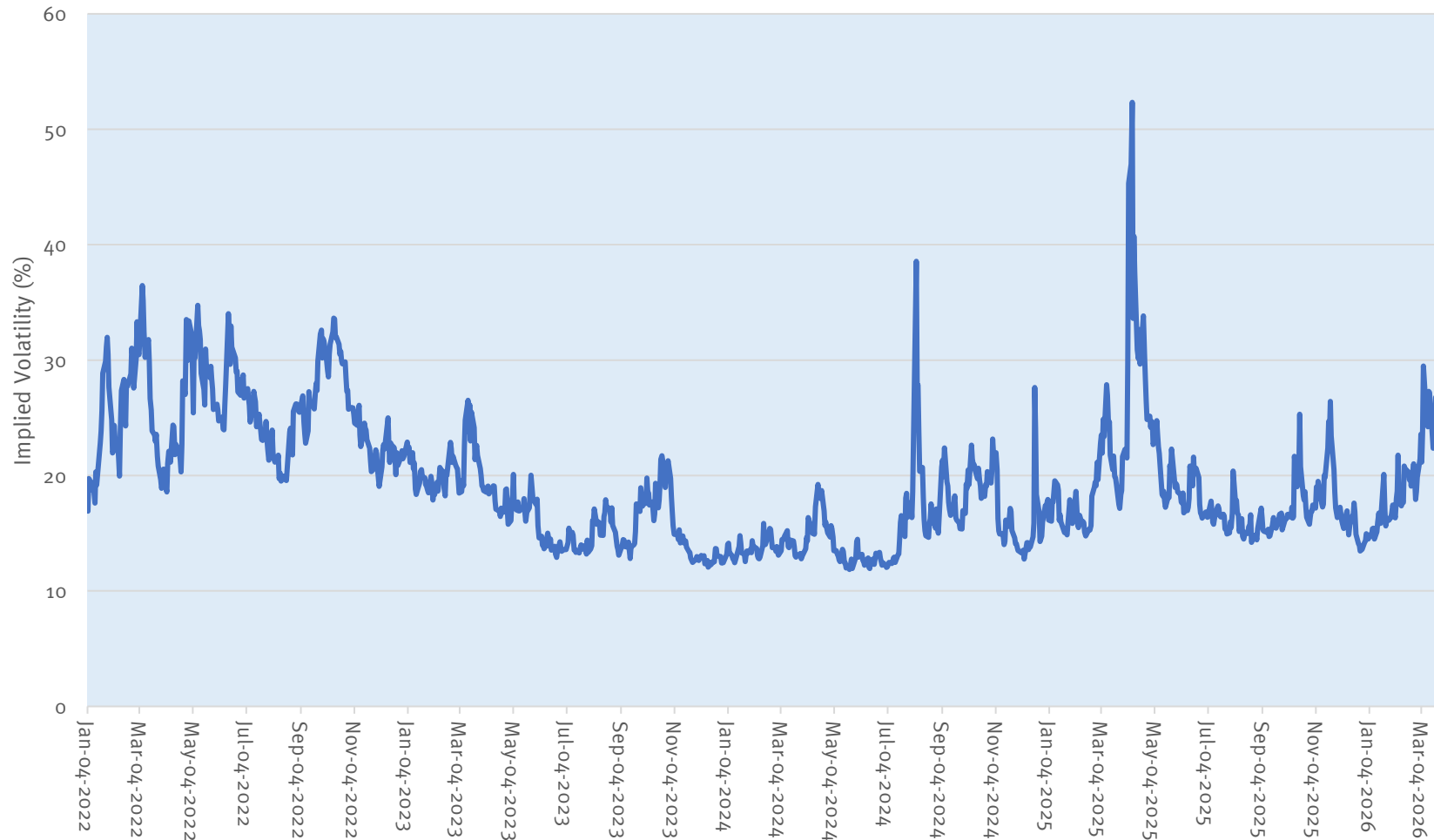
# Macro Picture

Interaction of Darkness and Light, Arastradero Preserve, Palo Alto, CA, March 2026



# The VIX, a Measure of Market Fear, Remains Elevated

CBOE Volatility S&P 500 Index (VIX) - Index Value, Jan 5, 2022 to Apr 1 2026



Despite the recent market rally, the CBOE Volatility Index (VIX) remains somewhat elevated.

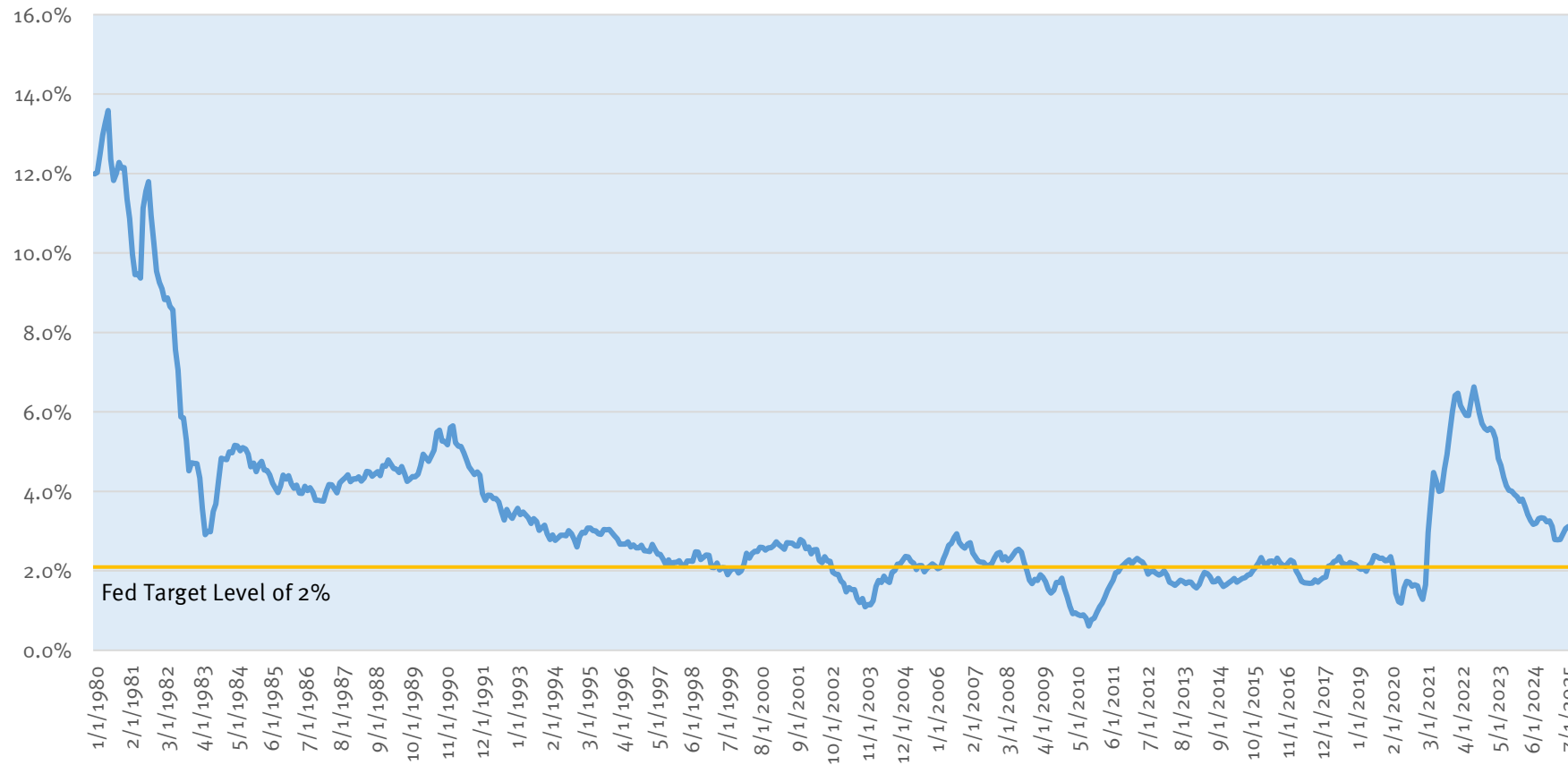
The VIX measures the market's expected volatility for the S&P 500 over the next 30 days, inferred from option prices, and is commonly viewed as a gauge of investor fear or uncertainty. A decline in the VIX to around 22% from over 30% indicates that investors are becoming calmer but are still somewhat worried about the impact of the Iran War on the macroeconomy and the market.

This elevated VIX level implies that biotech capital markets activity, particularly IPO's, may be muted in the weeks ahead.

# Core US CPI Inflation is Down and Has Stayed Down

The rise in inflation following the Pandemic has been an absolute anathema to the biotech sector as inflation triggered a major flight from owners of biotech stocks at rates rose. Despite the threat of higher oil prices and tariffs, we are seeing that inflation is down and is staying down.

Core U.S. CPI Inflation, Jan 1980 to Feb 2026



Core CPI—defined as the consumer price index excluding food and energy—has enduring value as an inflation signal because it filters out the most volatile components of household spending and thereby provides a clearer view of persistent, policy-relevant price pressures.

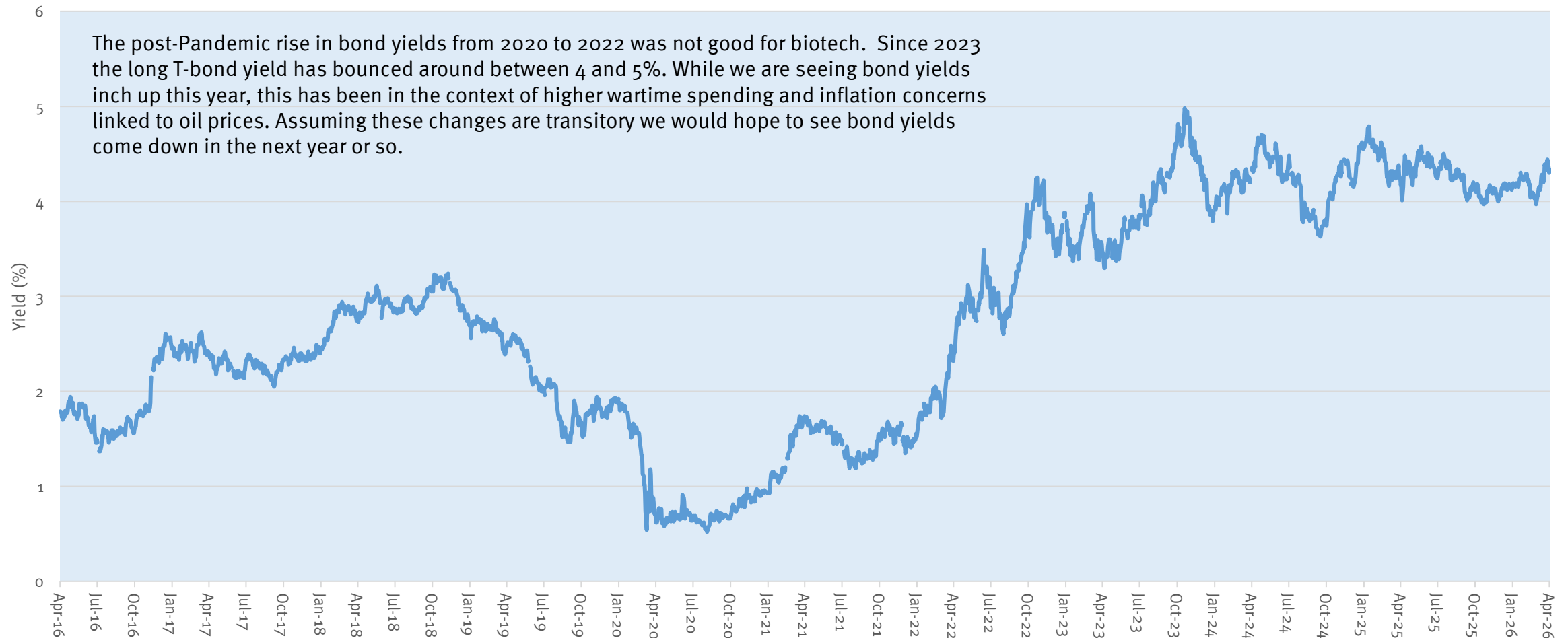
The Jan 2026 core inflation read was 2.5%. The Feb 2026 core inflation read was also 2.5%.

Underlying inflationary pressures appear to have been benign. Inflation is getting close to the Fed target level of 2%.

Bearish elements include very strong recent employment numbers and increases in energy costs linked to higher oil prices in March and April.

# The Ten-Year U.S. Government Treasury Yield Has Been Steady in 2026 Despite a Volatile Geopolitical Environment

U.S. Ten Year Treasury Bond Yield, April 3, 2016 to Apr 2, 2026



The post-Pandemic rise in bond yields from 2020 to 2022 was not good for biotech. Since 2023 the long T-bond yield has bounced around between 4 and 5%. While we are seeing bond yields inch up this year, this has been in the context of higher wartime spending and inflation concerns linked to oil prices. Assuming these changes are transitory we would hope to see bond yields come down in the next year or so.

# US Labor Market Posts Largest Jobs Gain in 15 Months, But Clouds Brewing From Iran War

Lucia Mutikani, Reuters, April 3, 2026 (excerpt)

WASHINGTON, April 3 (Reuters) - U.S. job growth rebounded more than expected in March as a strike by healthcare workers ended and temperatures warmed up, but downside risks for the labor market are mounting from a war with Iran that has no clear end in sight.

The biggest increase in nonfarm payrolls in 15 months, and also the largest since President Donald Trump returned to the White House, followed a sharp decline in February, the Labor Department's closely watched employment report showed on Friday.

Nonetheless, the rebound exaggerates the labor market's health. The average workweek was shorter last month and annual wage growth increased at its slowest pace in nearly five years.

While the unemployment rate fell to 4.3% from 4.4% in February, that was because 396,000 people dropped out of the labor force, more than offsetting weakness in household employment. The labor force participation rate fell below 62% for the first time since the COVID-19 pandemic.

Economists said March was too early to capture the fallout from the Middle East conflict.

"This is an on-the-one hand, on-the-other kind of a job market," said Bill Adams, chief U.S. economist at Fifth Third Commercial Bank. "This report tells us next to nothing about the Iran war's impact on the job market."



# Fed Also in a Quandary: Perhaps a Rate Hike is the Right Next Move?

Jeff Cox, *CNBC*, March 27, 2026 (excerpt)

Surging energy prices, rising import costs and mounting stagflation concerns are pushing markets to consider that the Federal Reserve's next move could be a rate hike.

Traders in the futures market pushed the probability of a rate increase by the end of 2026 to 52% on Friday morning, the first time it has crossed the 50% threshold, according to the CME Group FedWatch tool.

The move comes as global benchmark crude prices topped \$110, adding to a series of developments this week signaling that inflation pressures may be building as the Iran war drags on and U.S. tariffs raise costs.

Adding to the inflation concerns, the Bureau of Labor Statistics reported Wednesday that import prices jumped 1.3% in February, the largest monthly increase since March 2022, while export prices rose 1.5%, the biggest gain since May 2022.

At the same time, the Organization for Economic Cooperation and Development sharply raised its forecast for U.S. inflation this year. The global forecasting agency estimates headline prices to rise at a 4.2% rate, far above its prior forecast and well above Fed expectations for 2.7%.

However, in a speech Thursday, Federal Open Market Committee Vice Chair Philip Jefferson indicated that the recent developments are not necessarily an impetus to raise rates. Instead he noted that uncertainty over tariffs and the jump in oil prices "complicates, at least in the short term, the picture on both sides of our dual mandate of maximum employment and price stability" meaning "downside risk to the labor market and upside risk to inflation."

"While that is a potentially challenging situation, I am confident that our current policy stance is well positioned to respond to a range of outcomes," Jefferson added.

The FOMC next meets April 28-29. Market implied odds are overwhelmingly for the Fed to stay on hold, with just a 6.2% probability of a hike.

# Biopharma Market Update

View of Pacific Ocean from Marin Headlands, Biotech Group Hike, March 2026



# Why 2026 Is Biotech's Comeback Year

Nilesh Kumar, *Barrons*, April 1, 2026 (excerpt)

Market sentiment is currently cautious at best. IPO activity and venture capital funding for biotechs, particularly those backing more exploratory new treatments, have dropped off meaningfully.

At the peak of the biotech boom in 2021, more than half of the 104 companies that went public in the U.S. were either preclinical or in Phase 1 trials—the earliest stages of testing for new medicines—and therefore the most speculative stage from an investment standpoint. By 2024, the number of new offerings had dwindled to 24. Last year, only 11 biotech companies joined the market. Just one was a company whose leading drug candidate was in early-stage trials.

Some uncertainty around the Food and Drug Administration remains, but we believe scientifically rigorous and evidence-based approaches will win this year; good drugs that address unmet medical needs won't sit on the shelves. That is good news for the venture firms seeking liquidity and for a stock market looking for promising growth stories.

There is likely going to be more M&A activity in the obesity space as incumbents and challengers position for this large market segment. Novel obesity drugs that improve on the current standard of care in obesity are being developed by a number of biotechs and will be of interest to pharma acquirers. Besides obesity, arguably the biggest unmet need in biotech today are therapies for dementia. Effective treatments, let alone a cure, for Alzheimer's and other neurodegenerative diseases have been extraordinarily difficult to develop, but that may change soon. Drug candidates aimed at treating Alzheimer's are due to present late-stage clinical trial results this year. The industry is hopeful that at least some of these candidates will show effectiveness in slowing or reversing cognitive decline.



# The XBI Closed at 128.8 at On April 6, Up 6% Year to Date

Treasury yields are up 9 basis points so far this year on fears of inflation linked to higher oil prices. The XBI is up 6% for the year and is up 57.5% from the end of Q1 in 2025. The XBI shot up in the week of March 30<sup>th</sup> on exceptional M&A volume after having drifted down during the Iran war. This is clearly evident in the spike at far right in the chart below.

## Biotech Stocks Up Last Week

Return: Mar 27 to Apr 6, 2026

Nasdaq Biotech Index: +5.5%  
 Arca XBI ETF: +7.8%  
 Stifel Global Biotech EV (adjusted): +7.5%\*  
 S&P 500: +3.4%

Return: Dec 31, 2025 to Apr 6, 2026 (YTD)

Nasdaq Biotech Index: +2.5%  
 Arca XBI ETF: +5.8%  
 Stifel Global Biotech EV (adjusted): +12.5%\*  
 S&P 500: -3.8%

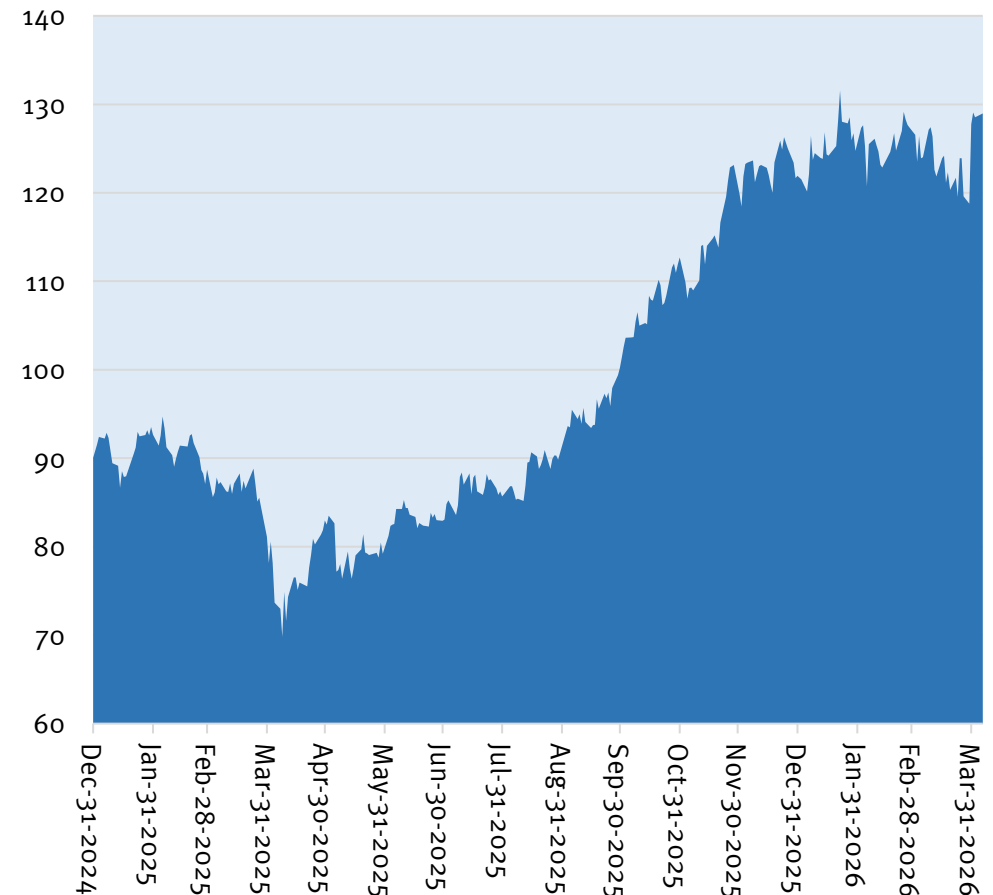
## VIX Down in Last Week

Dec 29, 2023: 12.45%  
 Dec 31, 2024: 17.4%  
 Dec 31, 2025: 15.0%  
 Jan 30, 2026: 17.4%  
 Feb 27, 2026: 19.9%  
 Mar 20, 2025: 26.7%  
 Mar 31, 2025: 25.5%  
 Apr 6, 2025: 24.2%

## 10-Year Treasury Yield Flattish

Dec 29, 2023: 3.88%  
 Dec 31, 2024: 4.57%  
 Dec 31, 2025: 4.18%  
 Jan 30, 2026: 4.26%  
 Feb 27, 2026: 3.97%  
 Mar 20, 2025: 4.39%  
 Mar 31, 2025: 4.30%  
 Apr 6, 2025: 4.35%

XBI, Jan 1, 2025 to Apr 6, 2026

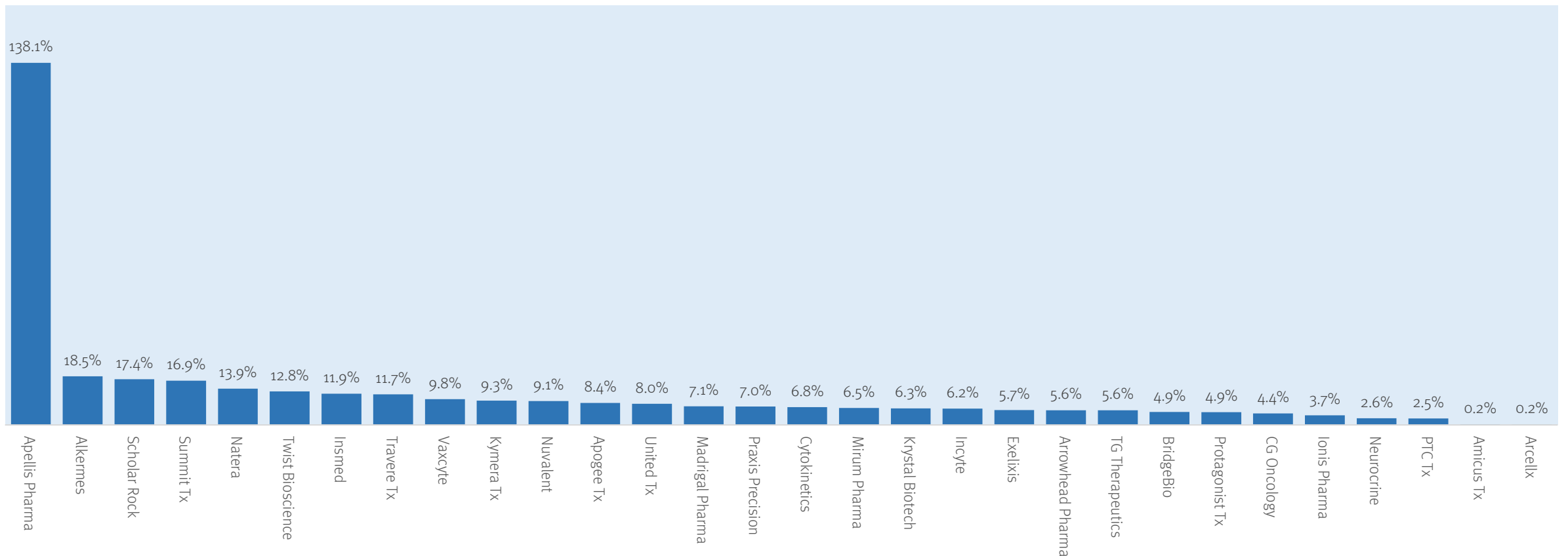


\* Change by enterprise value. The adjusted number accounts for the effect of exits and additions via M&A, bankruptcies and IPOs. The annual change by market cap is even higher.

# XBI 30 Up Big Last Week

This chart shows the change in market cap last week for the 30 most influential stocks in the XBI. These 30 stocks comprise 37% of the weight of the XBI (out of 147 stocks total). The mean percentage change in value last week was +12.2%. The median change was +6.9%. Appellis jumped the most on a takeout by Biogen. Also strong last week were Alkermes, Scholar Rock and Summit Therapeutics.

Top 30 XBI Influencers, Percent Change in Market Cap, Week of Mar 29 to Apr 3, 2026

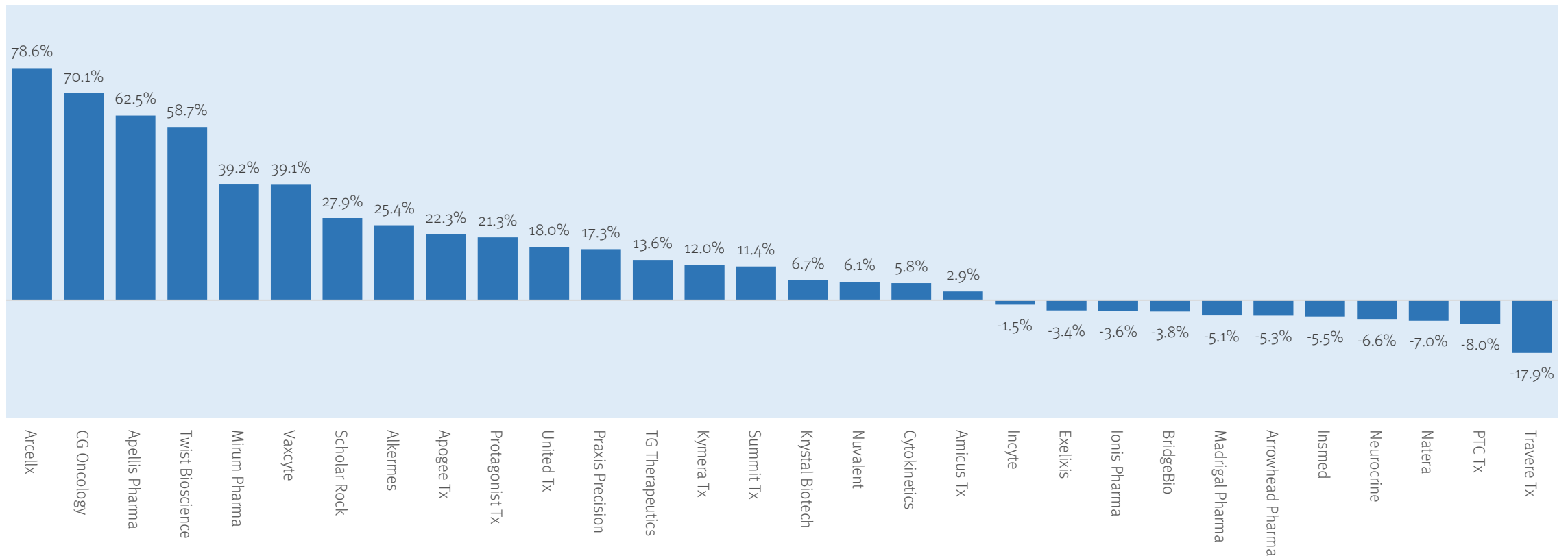


Source: CapitalIQ.

# XBI 30 Performance Year to Date

This chart shows the change in market cap this year for the 30 most influential stocks in the XBI. These 30 stocks comprise 37% of the weight of the XBI (out of 147 stocks total). The biggest gainers this year have been Arcellx (M&A deal), CG Oncology, Apellis (M&A deal), Twist Bio, Mirum Pharma and Vaxcyte. Traverre has been down on concerns related to their label expansion. The average increase of the 30 stocks that lead the XBI has been and the median has been 9.1%.

Top 30 XBI Influencers, Percent Change in Market Cap, Week of Dec 31, 2025 to Apr 3, 2026

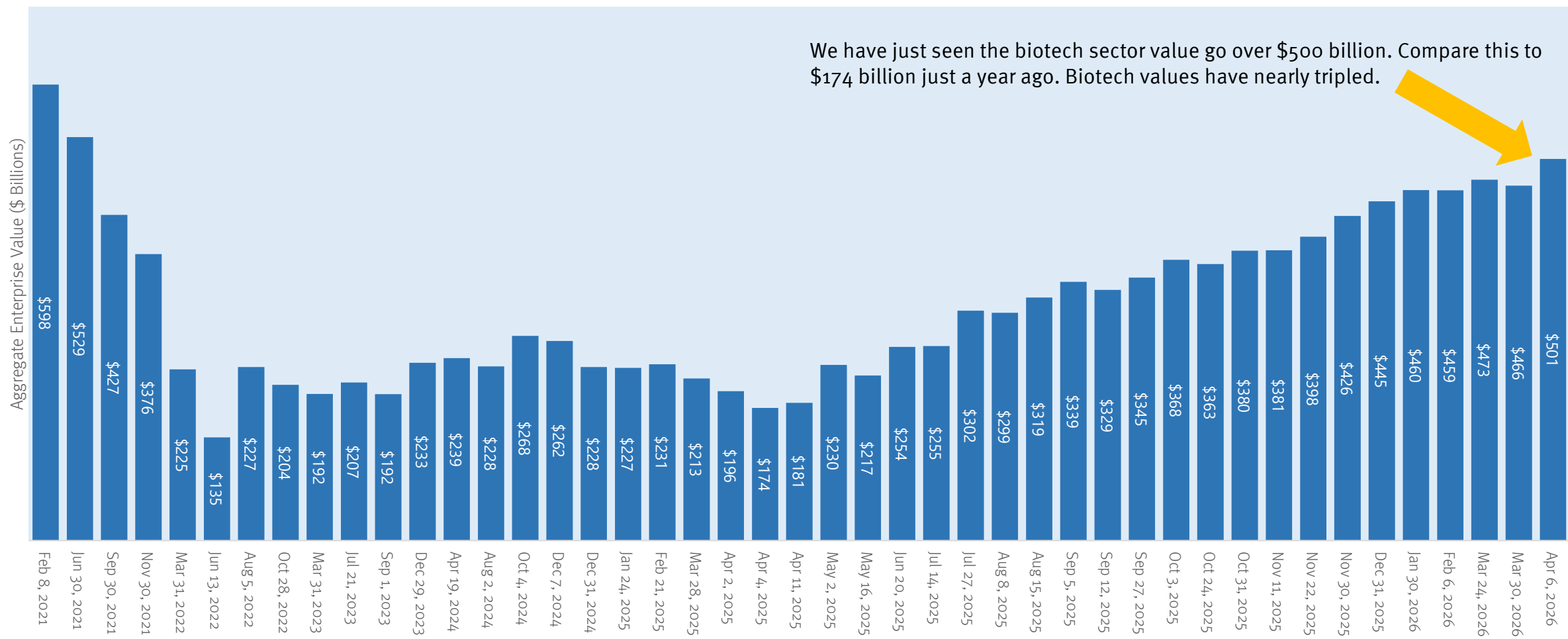


# Total Global Biotech Sector is up 12.5% This Year

Biotech stocks were up meaningfully last week (7.5%) on the heels of an extraordinary wave of merger activity.

## Total Enterprise Value of Publicly Traded Global Biotech, Feb 8, 2021 to Apr 6, 2026

(\$ Billions, Addition / Exit Adjusted)

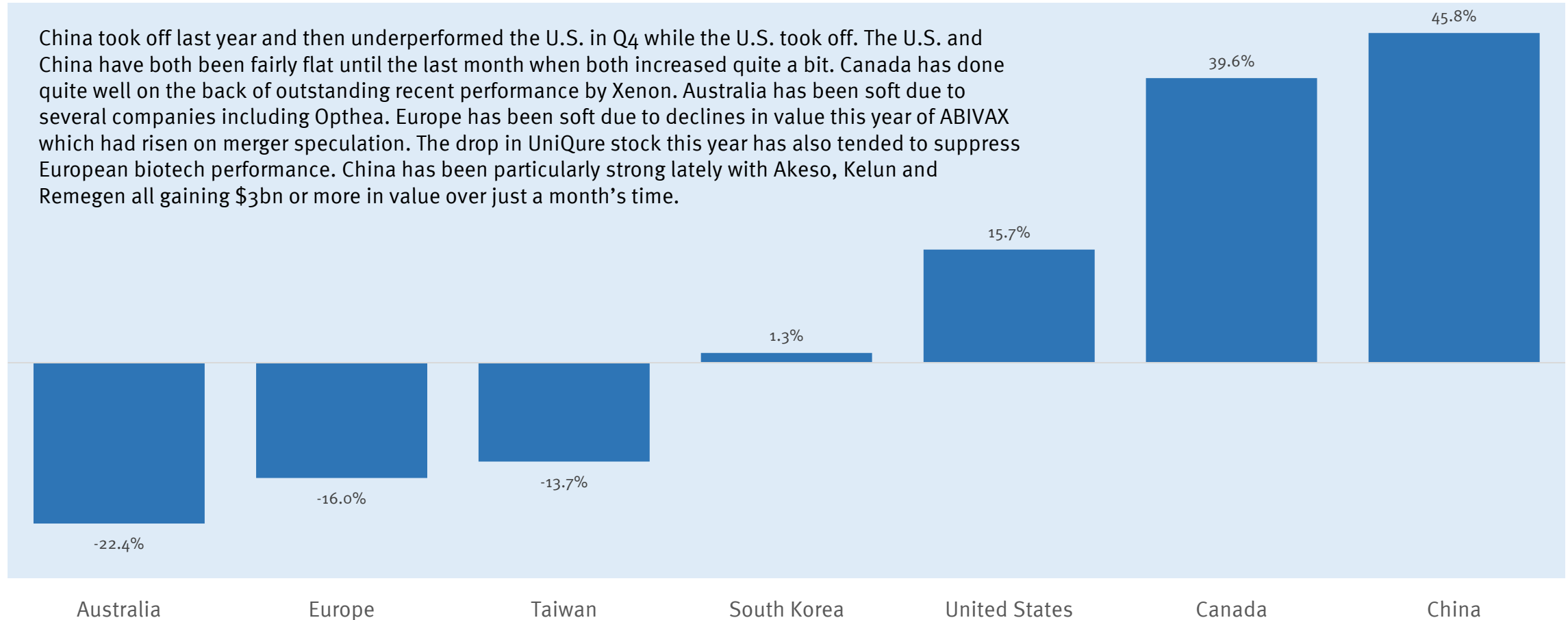


Source: CapitalIQ. Biotechs are defined as any therapeutics company without an approved product on any global stock exchange.

# Major Regional Differences in Biotech Performance in 2026

Percent Change in Total Market Cap of Public Biotech by Country/Region, Dec 31, 2025 to March 31, 2026

China took off last year and then underperformed the U.S. in Q4 while the U.S. took off. The U.S. and China have both been fairly flat until the last month when both increased quite a bit. Canada has done quite well on the back of outstanding recent performance by Xenon. Australia has been soft due to several companies including Opthea. Europe has been soft due to declines in value this year of ABIVAX which had risen on merger speculation. The drop in UniQure stock this year has also tended to suppress European biotech performance. China has been particularly strong lately with Akeso, Kelun and Remegen all gaining \$3bn or more in value over just a month's time.

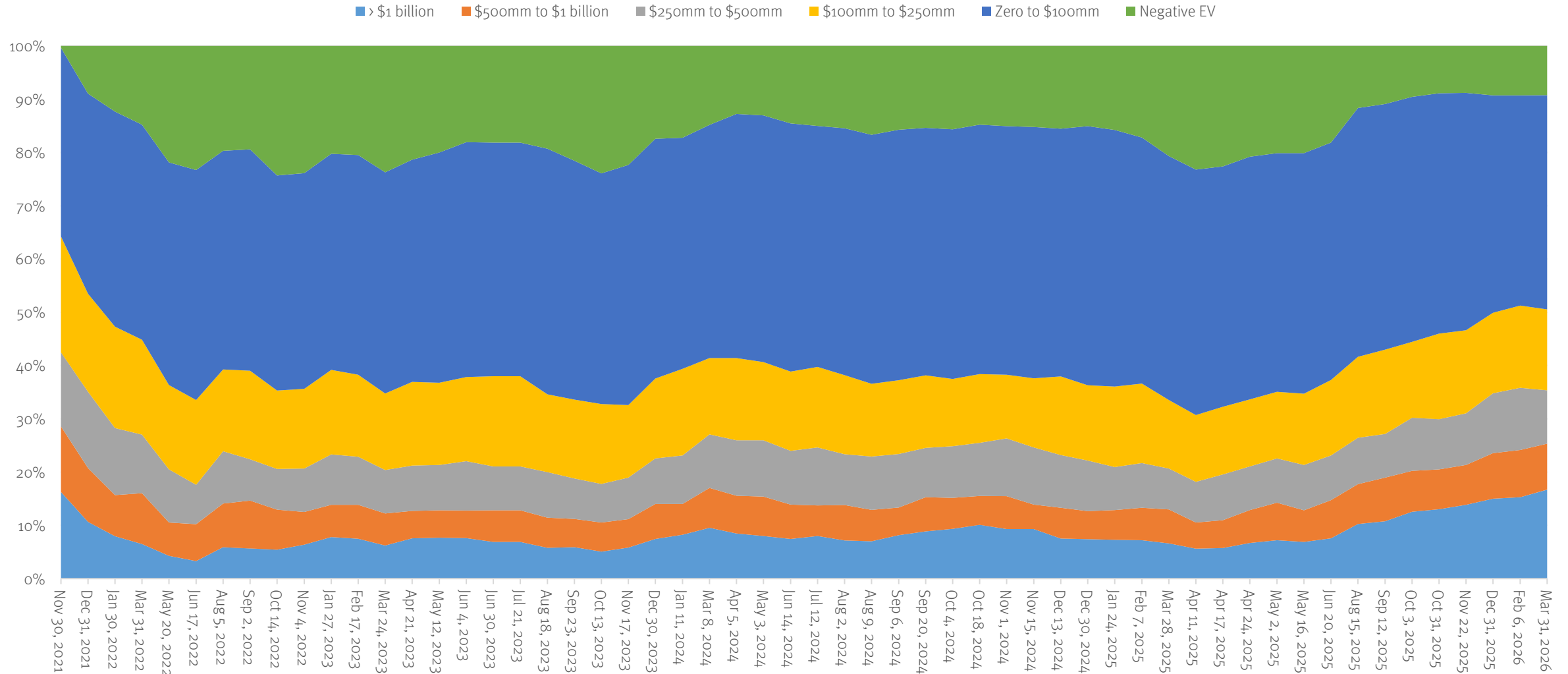


Source: CapitalIQ. Biotechs are defined as any therapeutics company without an approved product on any global stock exchange.

# Global Biotech Neighborhood Analysis

The population of biotechs trading for more than \$1 billion has grown steadily in recent months.

Global Biotech Universe by Enterprise Value Category, Nov 30, 2021 to Mar 31, 2026



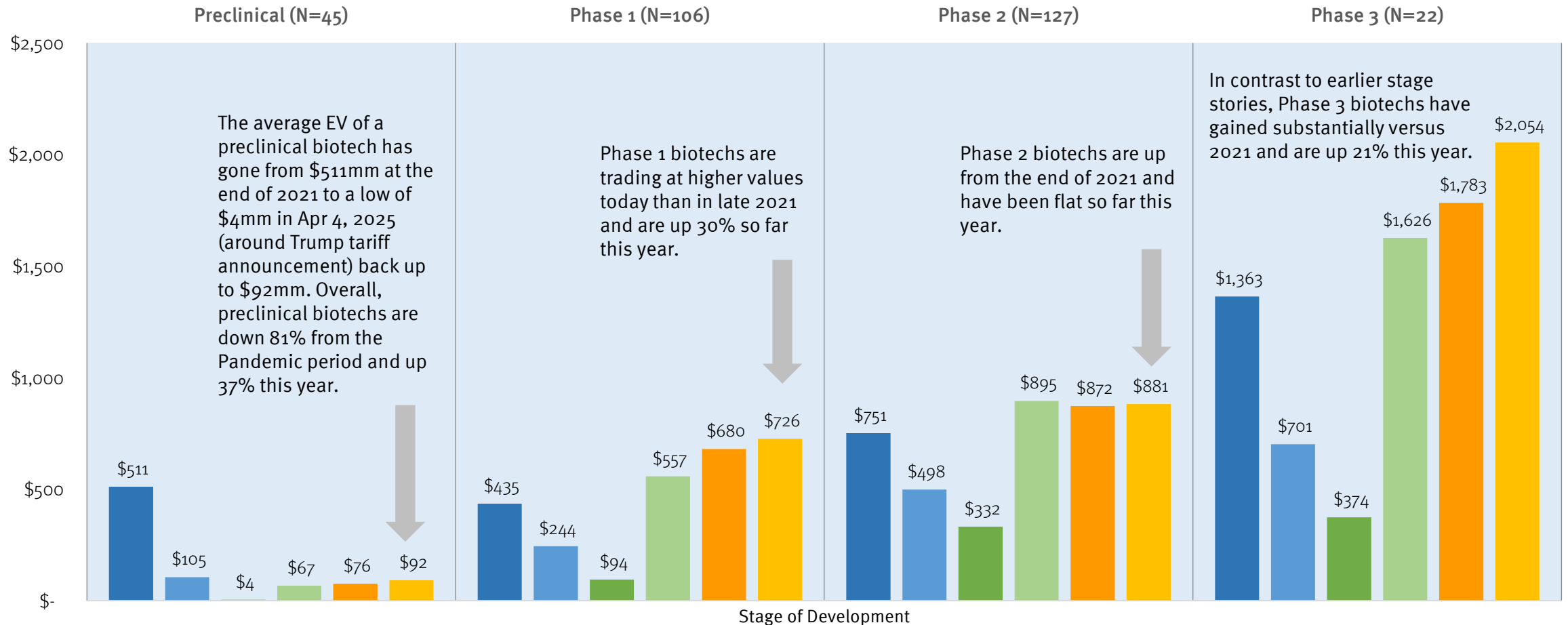
Source: CapitalIQ and Stifel analysis. Biotechs are defined as any therapeutics company without an approved product on any global stock exchange.

# Late-Stage Stories are Celebrated Most in Today's Biotech Market

## Average Enterprise Value of a Biotech Listed on U.S. Exchanges by Stage of Development

Dec 31 2021 to Mar 31, 2026 (\$ Millions)

■ Dec 31, 2021 ■ Dec 31, 2024 ■ Apr 4, 2025 ■ Dec 31, 2025 ■ Feb 6, 2026 ■ Mar 31, 2026



Source: CapitalIQ and Stifel analysis. Phase of development is defined by release of at least some efficacy data from a given stage of clinical development.

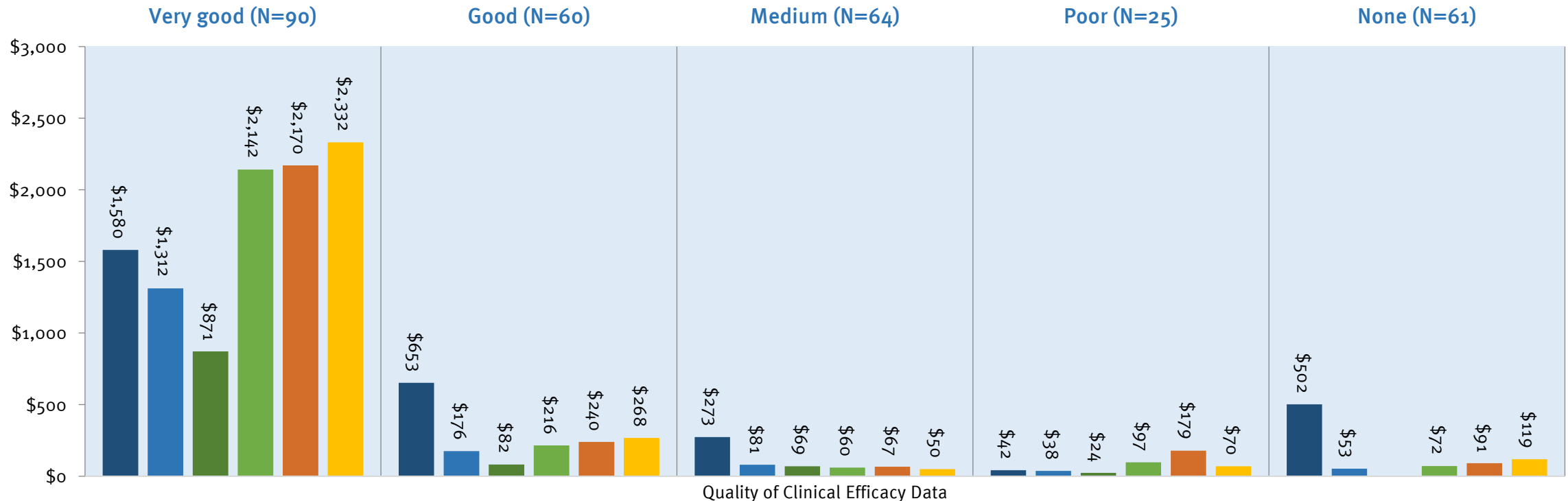
# The 2026 Biotech Market is Becoming Ever More Discerning

A common refrain in 2026 is that the biotech market remains a “have” and “have not” market. The data below are consistent with this idea. Specifically, on the U.S. market the 90 biotechs with a very good dataset are trading, on average, with a value over \$2 billion. In contrast, average values for those without such datasets are dramatically lower. Interestingly, valuations in 2026 have gone up for those with the best data while those with “medium” or “poor” data have actually gone down.

## Average Enterprise Value of a Biotech Listed by Quality of Efficacy Data

Dec 31, 2021 to Mar 31, 2026, (\$ Millions, US Exchanges Only, N=300)

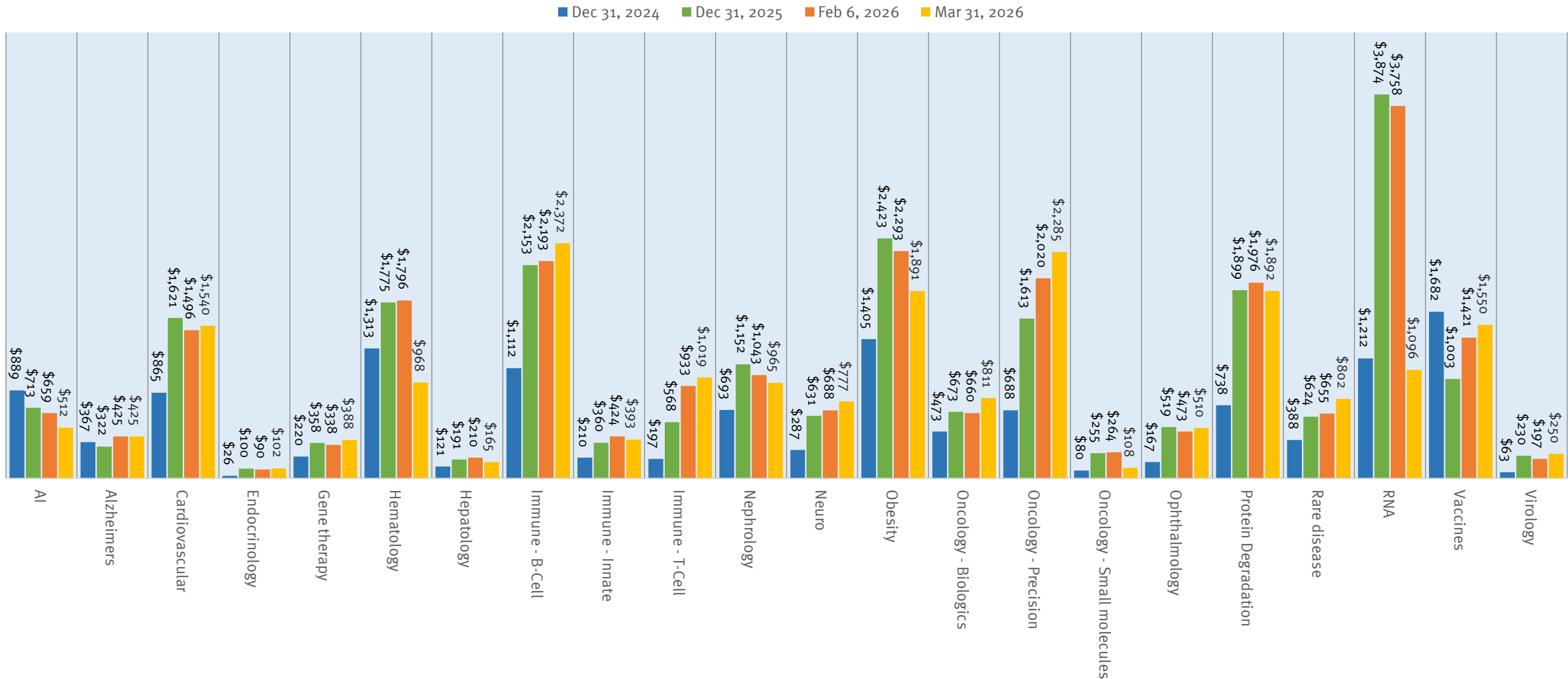
■ Dec 31, 2021 ■ Dec 30, 2024 ■ Apr 11, 2025 ■ Dec 31, 2025 ■ Feb 6, 2026 ■ Mar 31, 2026



Note: These data are sourced from CapitalIQ and based on Stifel research on the dataset quality for a company’s lead asset. We classified datasets that indicated a high probability that the drug would meaningfully improve on the standard of care for a disease as “very good”. We classified “good” data as data that might beat the standard of care. Medium data was data that was unlikely to beat the standard of care, was very early or came from a study with a mixed signal. Poor data reflects situations where a drug did not perform well at all in a clinical trial.

# U.S. Biotech Values Up Most in Oncology, B-Cell, Vaccines and CV

Average Enterprise Value of U.S. Public Biotechs in Key Therapeutic Areas, Mar 31, 2026 vs. Dec 31, 2024, Dec 31, 2025 and Feb 6, 2026 (N=300)

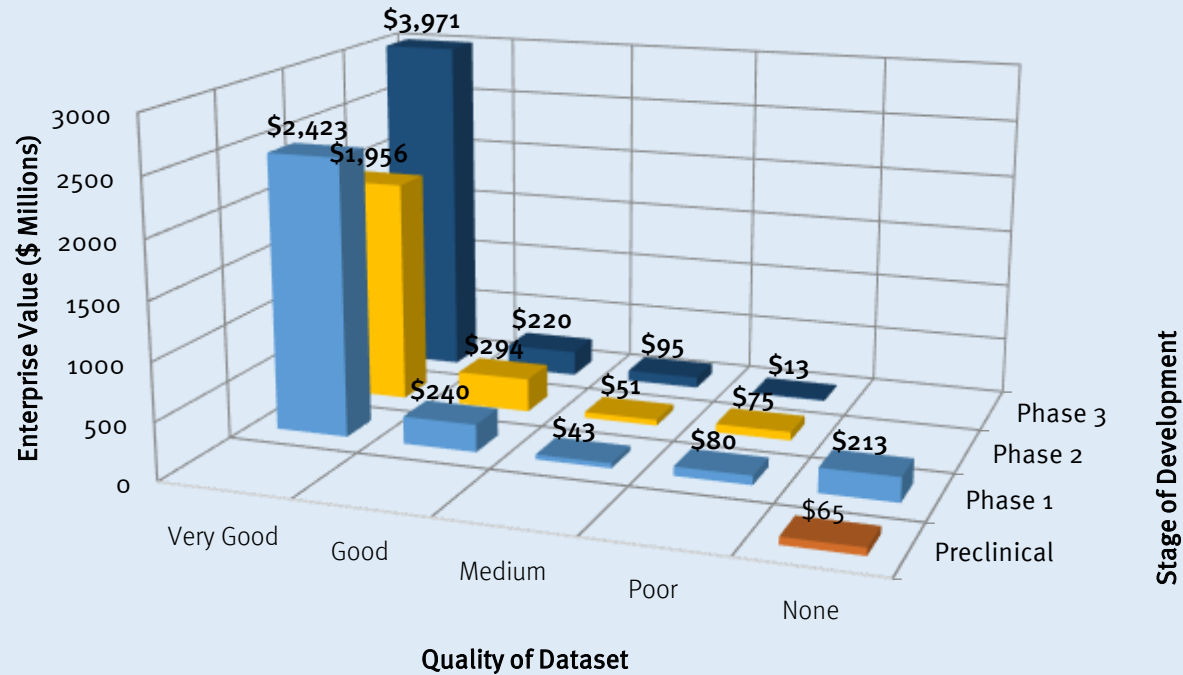


Source: S&P CapitalIQ and Stifel analysis. Biotechs are defined as any therapeutics company without an approved product on any global stock exchange. The RNA category dropped substantially because of the exit of Avidity from the dataset.

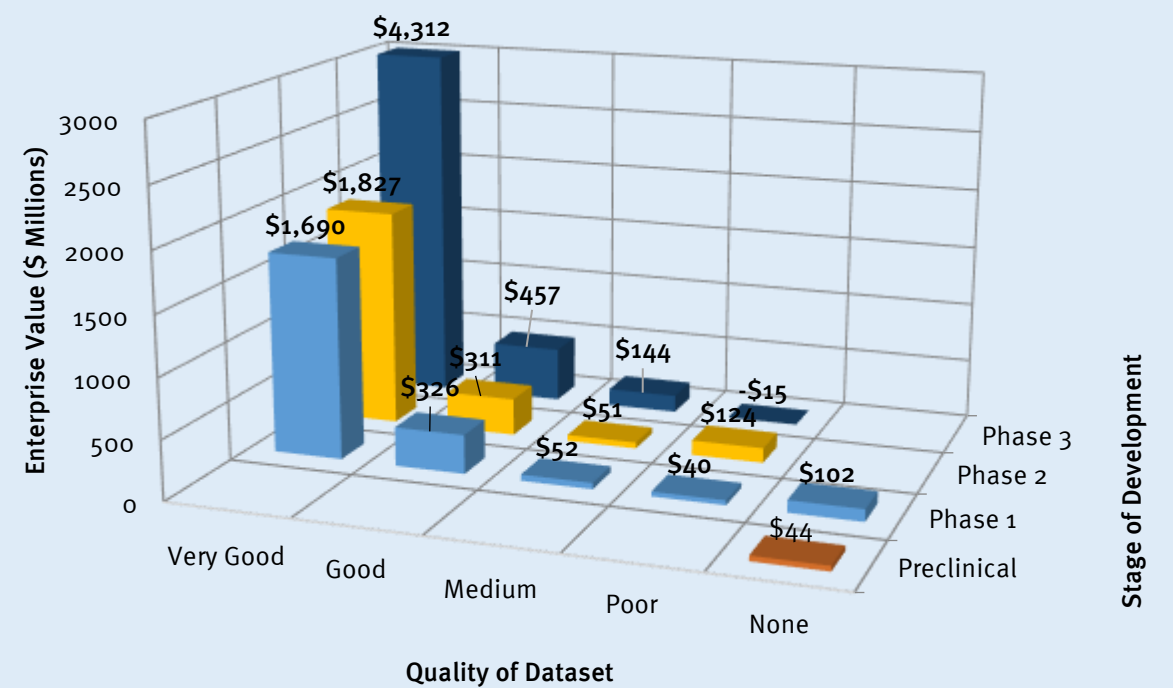
# The Most Valued Biotechs are Those With “Very Good” Phase 3 Data

The value / stage matrix has seen drops in valuations for companies with weaker datasets. The quality premium is going up in 2026.

Average Enterprise Value of a Biotech Listed on U.S. Exchanges by Stage of Development and Quality of Data, Mar 31, 2026



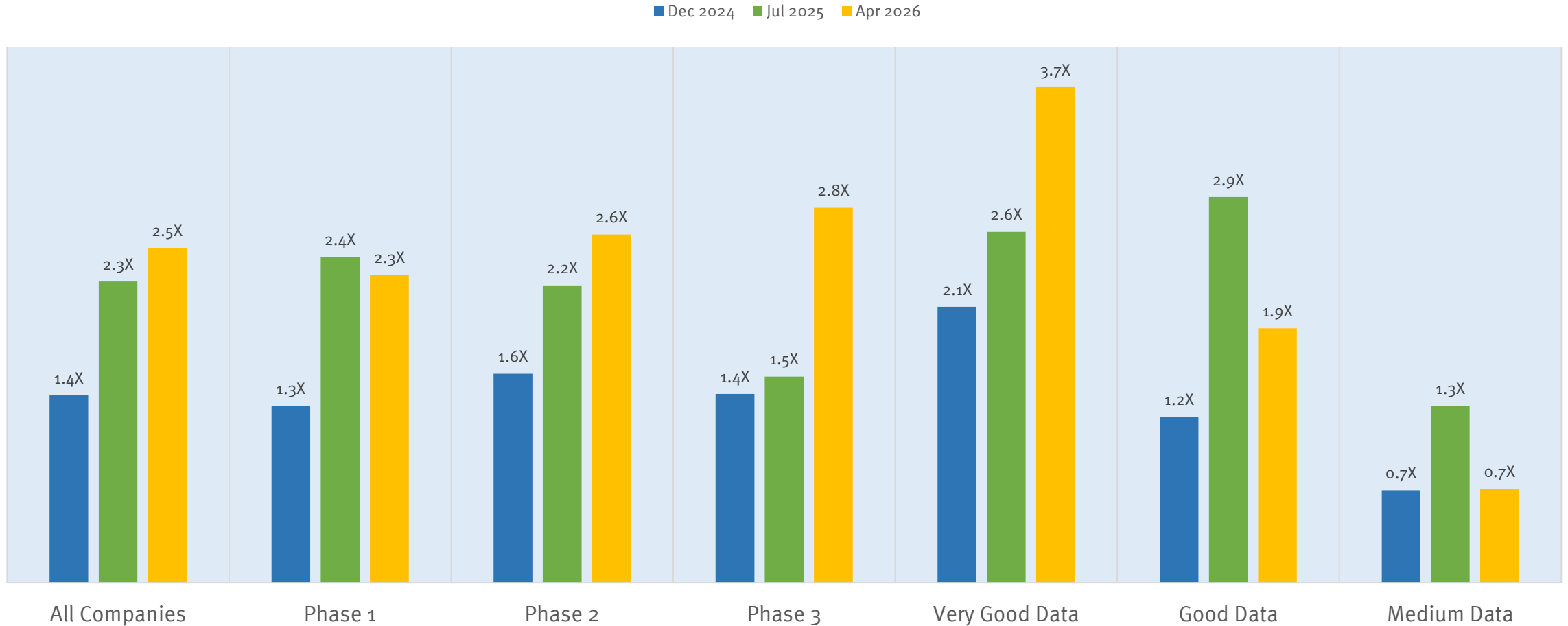
Average Enterprise Value of a Biotech Listed on U.S. Exchanges by Stage of Development and Quality of Data, Dec 31, 2025



**Notes:** These data are sourced from CapitalIQ and based on Stifel research on the dataset quality for a company’s lead asset. We classified datasets that indicated a high probability that the drug would meaningfully improve on the standard of care for a disease as “very good”. We classified “good” data as data that might beat the standard of care. Medium data was data that was unlikely to beat the standard of care, was very early or came from a study with a mixed signal. Poor data reflects situations where a drug did not perform well at all in a clinical trial. Stage of development refers to the stage of the last completed trial rather than the stage of ongoing clinical trials.

# The Market is Valuing Companies with Late Stage and High-Quality Datasets More Today Than Nine Months Ago

Average Forward Revenue Multiples, US Listed Biotech, Dec 2024 to Apr 2026



# Life Sciences Sector Gained \$226 Billion in Value Last Week

Last week saw strength in biotech and pharma services with a slight decline in valuations in HCIT and medical devices.

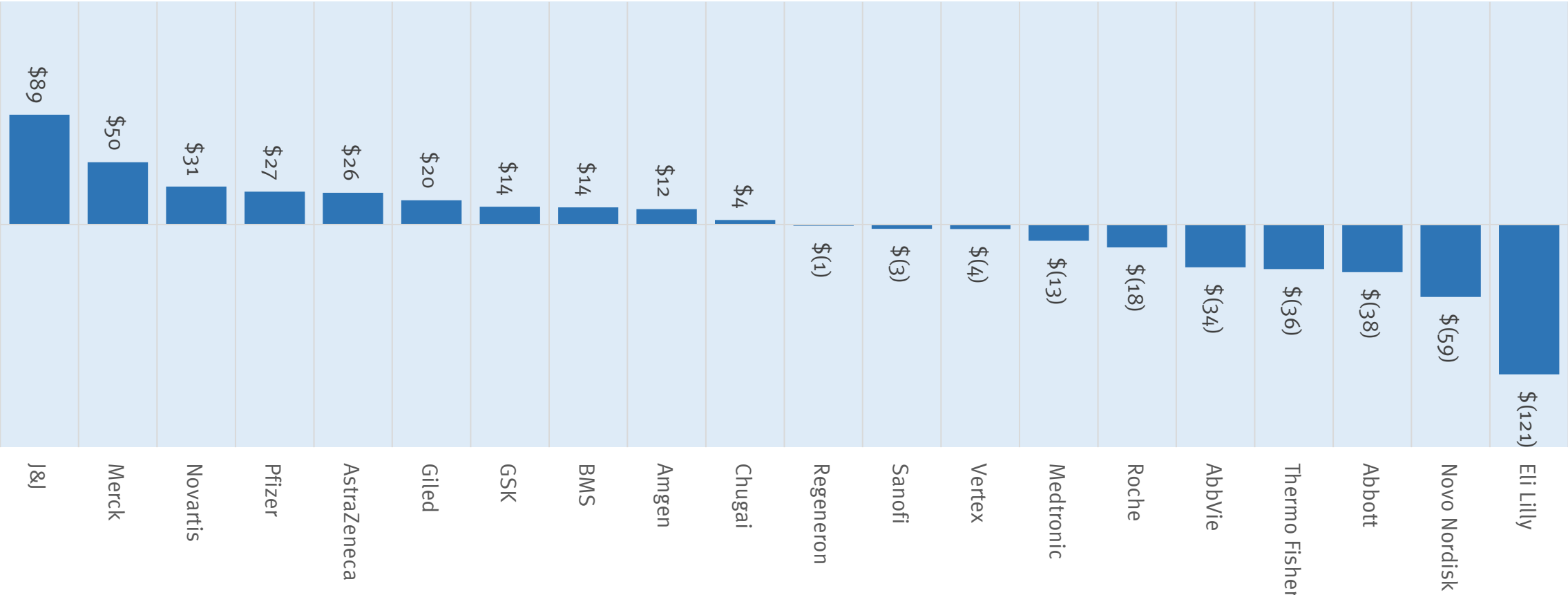
Sector	Firm Count	Enterprise Value (Mar 31, 2026, \$millions)	Change in Last Week (percent)	Change in Last Month (percent)	Change in Last Year (percent)
API	79	\$101,417	2.8%	-1.0%	16.1%
Biotech	642	\$426,034	6.1%	2.7%	-5.1%
CDMO	36	\$151,012	2.5%	-8.2%	2.1%
Diagnostics	72	\$238,202	0.0%	-8.2%	2.5%
OTC	28	\$21,309	1.8%	-2.0%	-10.2%
Commercial Pharma	676	\$7,129,231	2.8%	-3.6%	17.4%
Pharma Services	38	\$183,190	6.7%	1.0%	16.5%
Life Science Tools	48	\$579,330	1.0%	-4.2%	1.2%
Medical Devices	168	\$1,556,360	-1.1%	-8.8%	-12.1%
HCIT	7	\$15,559	-3.4%	-11.1%	-34.9%
<b>Total</b>	<b>1794</b>	<b>\$10,401,643</b>	<b>2.2%</b>	<b>-4.3%</b>	<b>12.2%</b>

Source: CapitalIQ and Stifel analysis

# Gainers and Decliners Among Top 20 Life Sciences Companies YTD

We have seen the breakout of price competition by Novo Nordisk in the obesity field drag down the shares of Lilly and Novo in 2026. J&J has shown that its new portfolio has been able to completely overcome the Stelara® LOE, giving investors long-term confidence in the company’s story. Merck has also done well due to improving sales of Winreva®®, the possibility longer life for Keytruda® and a strong pipeline.

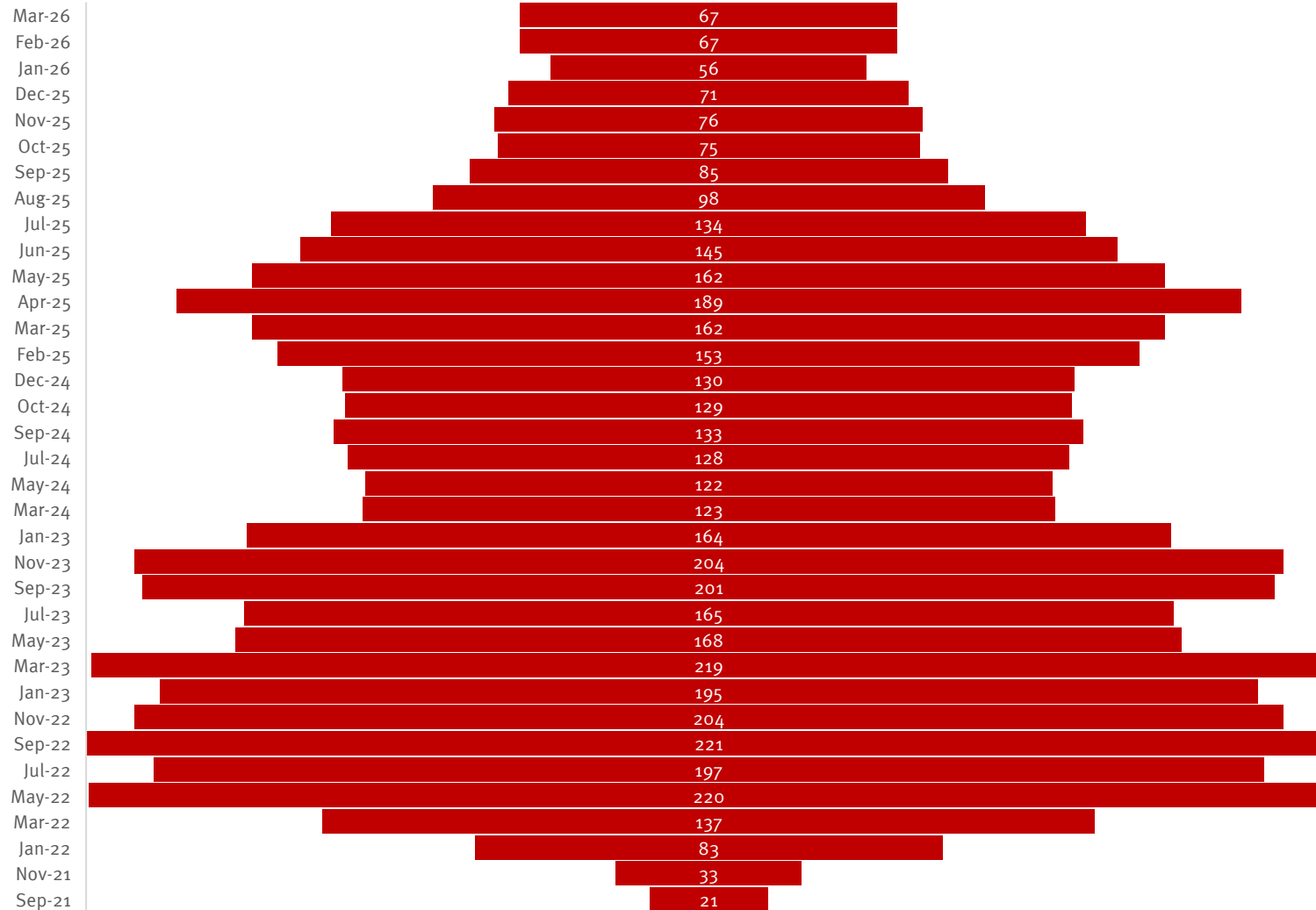
Change in Enterprise Value of Top 25 Companies in Life Sciences, Dec 31, 2025 to Apr 3, 2026 (\$ Billions)



Source: CapitalIQ

# Number of Negative Enterprise Value Life Sciences Companies Flat Over the Last Month

Number of Negative Enterprise Value Life Sciences Companies Worldwide



The count of negative EV life sciences companies has been flat over the last six weeks at 67 companies.

This measure of sector distress continues to be modest by recent standards but well above the levels seen during the Pandemic.

While aggregate biotech sector values are in the same range as they were during the Pandemic it is much more a world of “have” and “have nots” today as evidenced by the far higher count of negative EV players today.

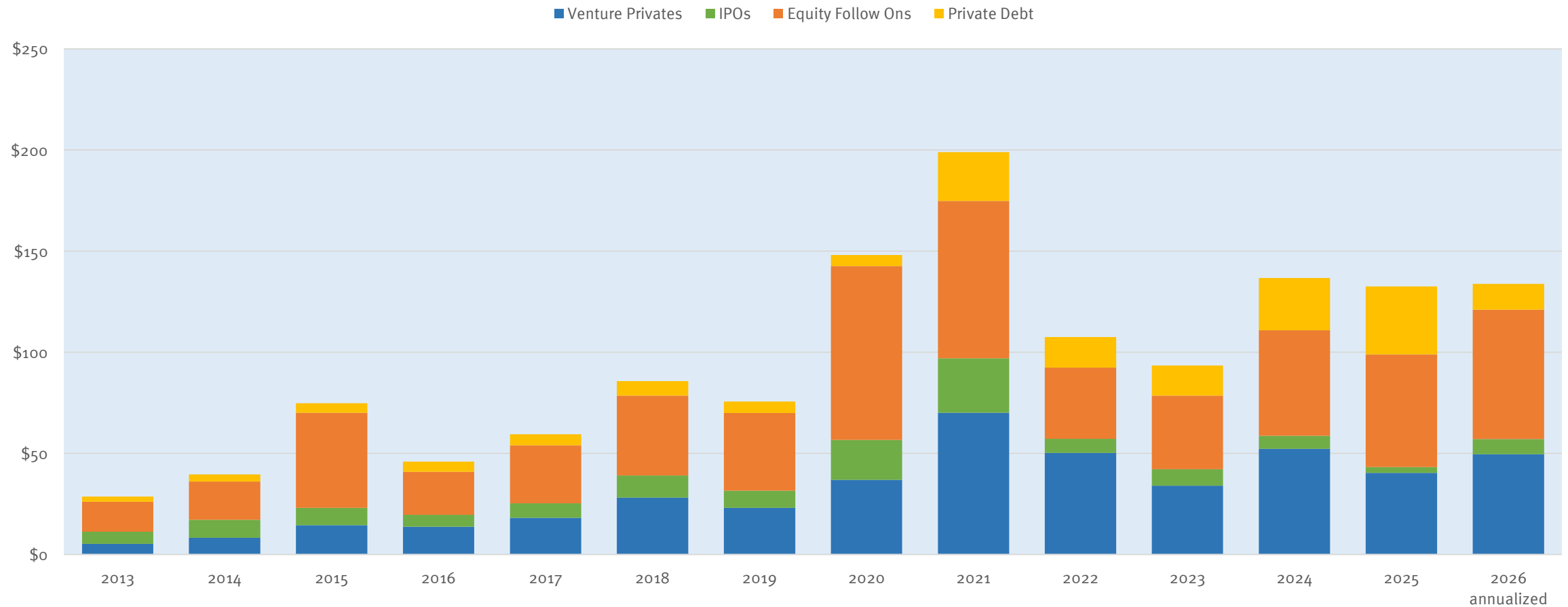
# Capital Markets Update

View of Golden Gate Bridge and Springtime Poppies from Fort Baker, CA, March 2026



# Overall Biopharma Financing Pace in 2026 is On Par with the Last Two Years

Equity Raised, Private Debt Raised in the Biopharma Sector, 2013 - Mar 31, 2026  
(Estimated, \$ Billions, Worldwide)

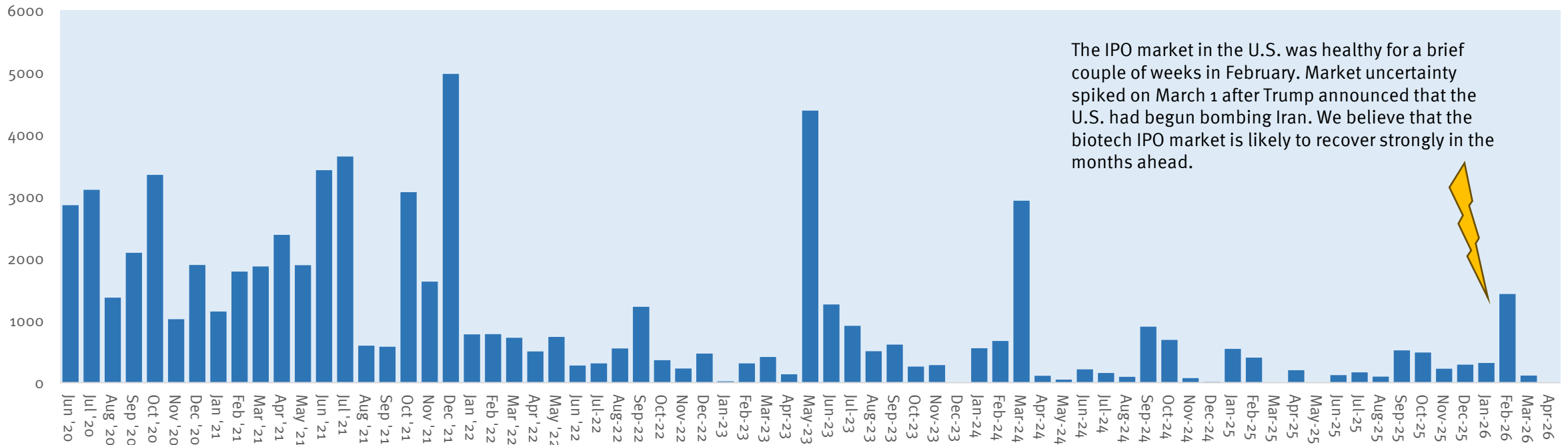


Source: Data from CapitalIQ and Stifel research.

# Biotech IPO Market Volume Picked up in February Only

Quite a large number of biotech companies are on file to go public or are thinking of doing so. The U.S. IPO market opened briefly in February when we saw a number of companies go public. Then, with the beginning of hostilities with Iran we have seen a far more unsettled market and the IPO window has not been open (broadly speaking). An interesting Q1 2026 phenomenon has been “queue jumping”. Companies with fully formed IPO books have been quietly shopping PIPE deals that can be used to fund market entry via a reverse merger. This can be done either with an S-4 process or a sign and close structure. The first major deal of this type was the Candid \$500mm structure. Since then, others have been taking this route or thinking of doing so. The benefit of this approach is to get public with certainty at a time when geopolitical uncertainty has complicated the IPO efforts of many.

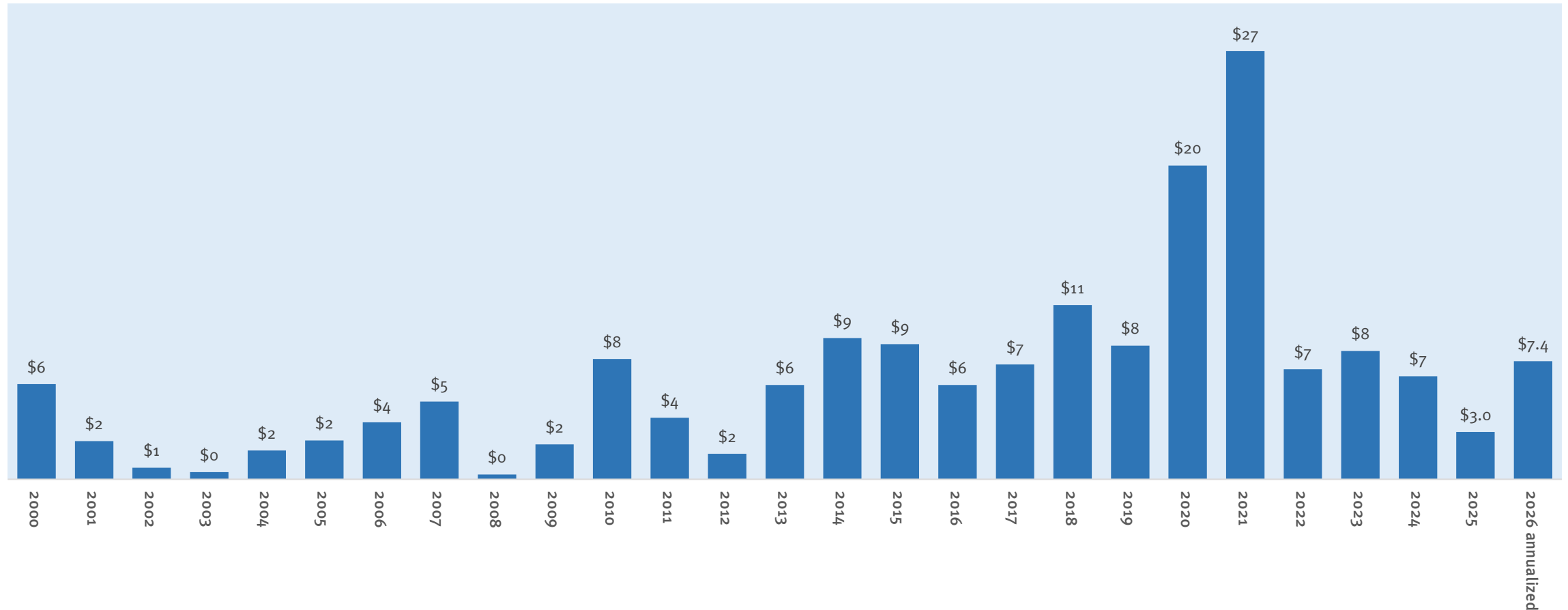
IPO (\$volume, \$mm), Jun 2020 to Apr 2026



Source: Data from CapitalIQ and Stifel research.

# IPO Market Thus Far This Year Has Been on the Light Side From an Historical Perspective

IPO Volume in the Biopharma Sector, 2000 - 2026 (annualized)  
(\$ Billions, Worldwide)

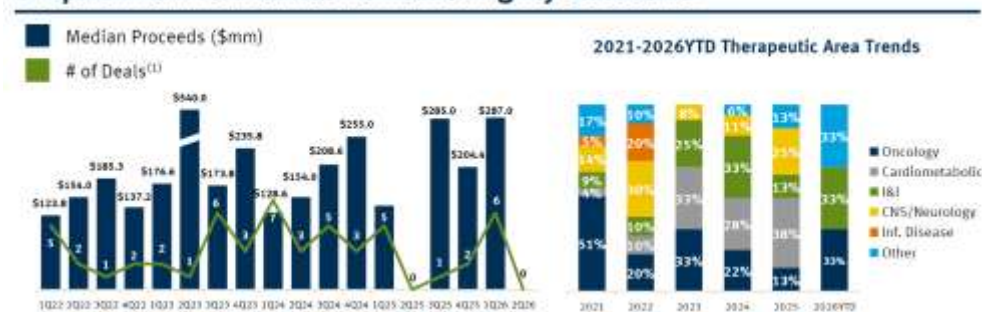


# Recent IPOs Have Delivered Solid Returns

Some statistics are shown at right on recent IPO activity sorted by market cap. Some key observations include:

1. Median and mean post-deal returns have been quite positive.
2. There is broad differences in post-deal returns. Veradermics' IPO this year has been followed by superb returns. In contrast, others have seen their shares drop.
3. Proceeds as shown below are up this year from earlier periods.

## Biopharma IPO Market Remains Highly Selective



## IPO Step-Ups Remain Deal Dependent



## 30 Most Recent Biotech IPOs

(\$ in millions)

Issuer	Offer Date	Issuance Amount	Pre-Money Valuation	Pricing vs. Range	Step-Up	Price Change Offer to	
						Day 1	Current
Generate Biomedicines, Inc.	02/26/26	\$400.0	\$1,847.1	Midpoint	0.9x	(20.9%)	(14.1%)
AgomAb Therapeutics NV	02/05/26	200.0	674.9	Midpoint	1.2x	(8.4%)	(33.0%)
SpyGlass Pharma, Inc.	02/05/26	150.0	399.4	Midpoint	1.2x	65.0%	40.4%
Eikon Therapeutics, Inc.	02/04/26	381.2	638.8	High End	0.4x	(16.7%)	(45.0%)
VeraDermics, Inc.	02/03/26	256.3	356.1	\$1.00 Above	1.3x	122.1%	277.6%
Aktis Oncology, Inc.	01/08/26	317.7	700.8	High End	1.2x	24.4%	(3.5%)
Evomune, Inc.	11/05/25	150.0	393.7	Midpoint	1.2x	26.4%	48.3%
MapLight Therapeutics, Inc. <sup>(3)</sup>	10/26/25	258.9	561.3	Fixed Price	1.1x	7.9%	24.5%
LB Pharmaceuticals Inc.	09/10/25	285.0	53.3	Midpoint	0.4x	15.3%	71.3%
Aardvark Therapeutics, Inc.	02/12/25	94.2	260.7	Low End	1.1x	(10.6%)	(73.1%)
Sionna Therapeutics, Inc.	02/06/25	190.6	619.6	High End	1.3x	38.9%	124.9%
Maze Therapeutics, Inc.	01/30/25	140.0	590.7	Midpoint	1.2x	(0.3%)	79.4%
Metsera, Inc.	01/30/25	275.0	1,697.8	\$1.00 Above	1.5x	47.2%	NA
Ascentage Pharma Group <sup>(4)</sup>	01/23/25	126.4	1,370.6	Below	NA	0.8%	58.4%
Septerna, Inc.	10/24/24	288.0	509.3	\$1.00 Above	1.7x	18.9%	39.9%
Upstream Bio, Inc.	10/10/24	255.0	693.0	High End	1.0x	29.4%	(44.1%)
CAMP4 Therapeutics Corp.	10/10/24	75.0	146.2	Below	0.7x	(2.5%)	(59.4%)
BioAge Labs, Inc. <sup>(5)</sup>	09/25/24	208.6	451.9	Midpoint	1.2x	1.7%	(2.8%)
Bicara Therapeutics Inc.	09/12/24	315.0	689.7	High End	1.4x	30.1%	19.3%
Zenas BioPharma, Inc.	09/12/24	225.0	484.7	Midpoint	1.1x	6.8%	26.2%
MBX Biosciences, Inc.	09/12/24	163.2	375.1	High End	1.3x	47.8%	106.2%
Artiva Biotherapeutics, Inc	07/18/24	167.0	122.8	Below	0.2x	0.0%	(43.8%)
Alumis, Inc. <sup>(6)</sup>	06/27/24	250.0	676.1	Low End	1.1x	(16.9%)	46.1%
Rapport Therapeutics, Inc. <sup>(7)</sup>	06/06/24	154.0	479.4	Midpoint	1.2x	22.4%	97.5%
Contineum Therapeutics, Inc.	04/04/24	110.0	319.2	Low End	1.1x	(3.8%)	(16.0%)
Boundless Bio, Inc.	03/27/24	100.0	295.8	Midpoint	1.2x	(10.9%)	(93.3%)
Metagenomi Technologies, LLC	02/08/24	93.8	469.2	Low End	0.6x	(31.3%)	(91.0%)
Kyverna Therapeutics, Inc.	02/07/24	319.0	652.3	\$3.00 Above	2.6x	36.4%	(59.7%)
Alto Neuroscience, Inc.	02/01/24	128.6	321.8	High End	1.5x	29.4%	35.5%
Fractyl Health, Inc.	02/01/24	110.0	606.6	Midpoint	0.8x	(14.3%)	(97.0%)

### Last 30 IPO Summary Statistics:

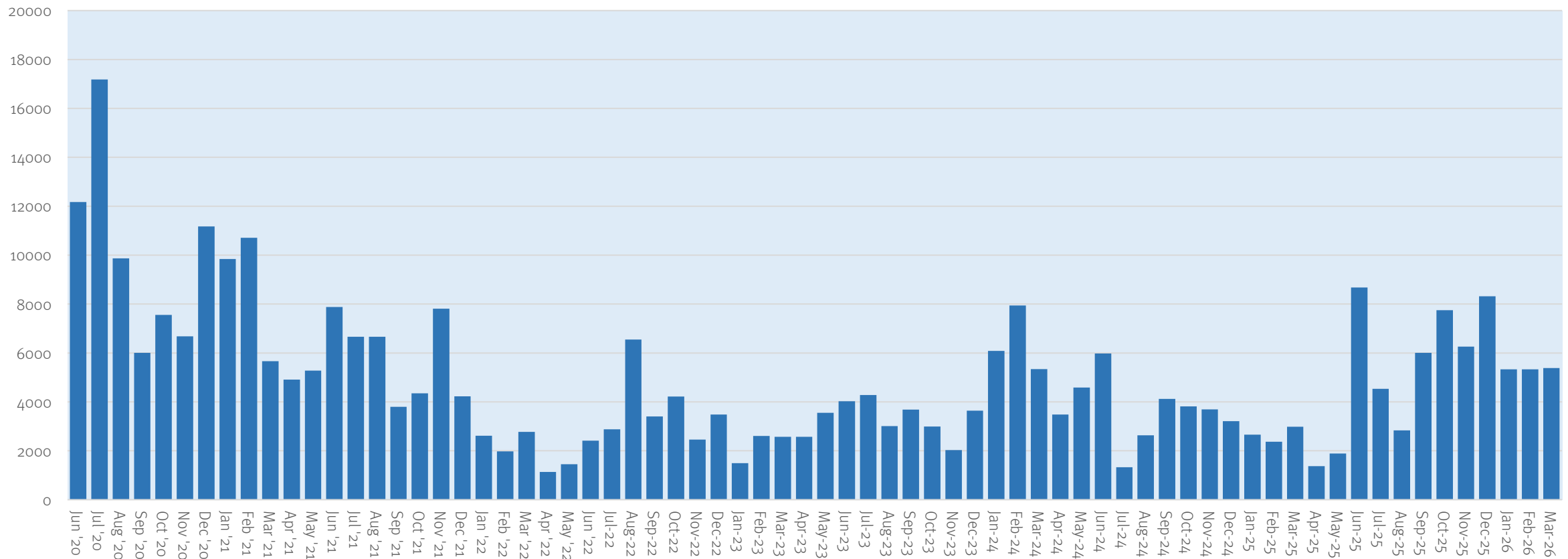
Mean	\$206.2	\$581.9	1.1x	14.5%	14.5%
Median	\$195.3	\$497.0	1.2x	7.3%	19.3%

Offers highlighted in yellow included Stifel as a bookrunner.

# \$15 Billion in Biotech Follow-On Issuance in Q1 2026

The first three months of 2026 saw biotech follow-on volume average \$5.3 billion a month, quite a robust level. However, this was down from Q4 of 2025 where we saw volume average \$7 billion a month. Overall, the market is healthy but remains highly selective – open primarily to companies with strong datasets.

Equity Follow-On (\$volume, \$mm), Jun 2020 to Mar 2026

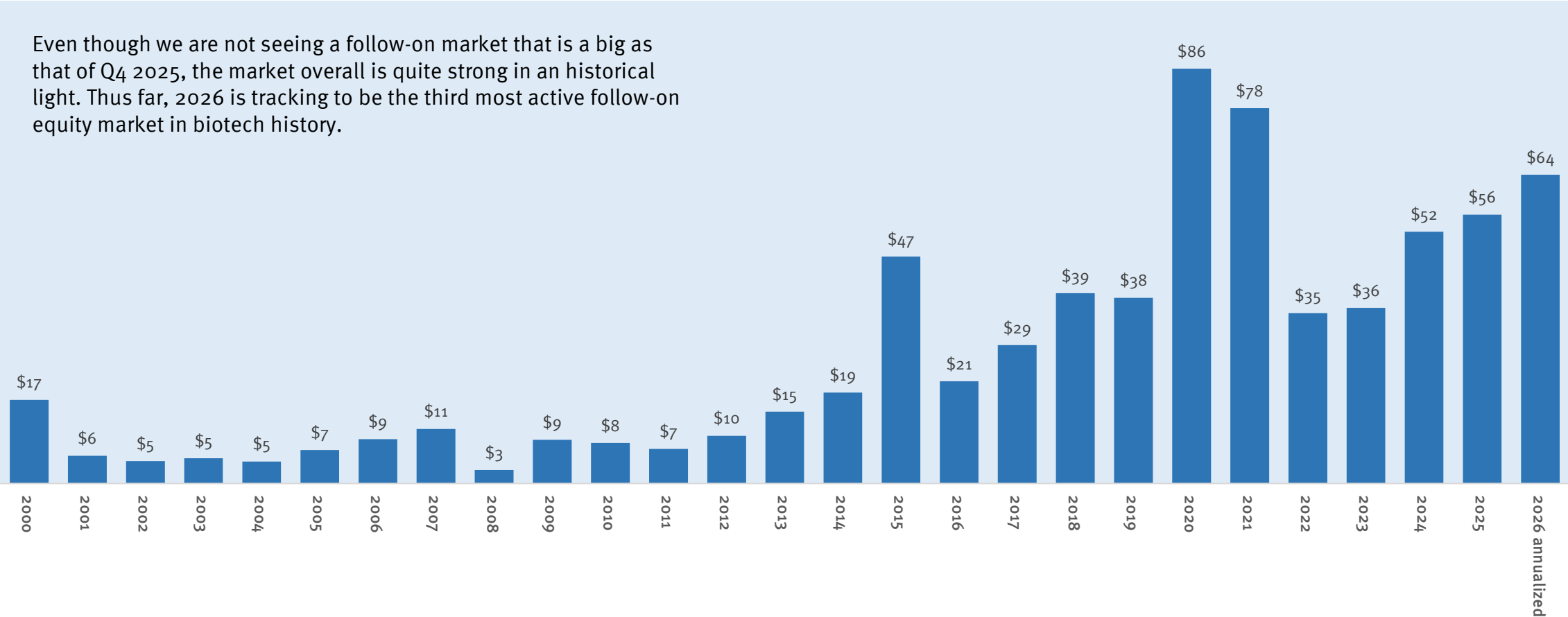


Source: Data from CapitalIQ and Stifel investment banking research.

# Follow-On Market This Year Has Been Strong From an Historical Perspective

Follow-On Equity Issuance in the Biopharma Sector, 2000 - 2026 (annualized)

(\$ Billions, Worldwide)



Source: Data from CapitalIQ and Stifel investment banking research.

# Recent Follow-Ons Have Delivered Solid Returns

Some statistics are shown at right on recent follow-on deal activity sorted by market cap. Some key observations include:

1. Smaller deals are more likely to be CMO's (confidentially marketed).
2. The average return from offer to current has been 6.5% but smaller market cap offerors have not generated positive average returns.
3. In contrast, follow-ons have largely done quite well in the day after issue.
4. Irrespective of market cap, the majority of deals have been catalyst-oriented.

Pricing Date	Issuer	Execution Format	Market Cap (\$mm)	Total Proceeds (\$mm)	File to Offer (%)	% Change		Deal Catalyst	Warrants?
						Offer to 1 Day (%)	Offer to Current (%)		
<b>Recent FOs with Market Cap &gt;\$2.5bn</b>									
03/24/26	Apogee Therapeutics Inc	Marketed	\$5,534.8	\$350.0	(11.7%)	12.2%	20.5%	✓	
03/10/26	Dianthus Therapeutics Inc	Marketed	\$3,677.5	\$625.0	2.2%	6.0%	6.2%	✓	
03/10/26	Xenon Pharmaceuticals Inc	Marketed	\$5,357.4	\$650.0	(9.2%)	3.6%	(0.3%)	✓	
01/29/26	Vaxcyte, Inc	CMO	\$7,208.6	\$550.0	(5.3%)	7.1%	16.8%	✓	
01/21/26	Erasca Inc	Marketed	\$2,783.2	\$225.0	1.9%	2.9%	78.1%	✓	
01/07/26	Arrowhead Pharmaceuticals, Inc.	Marketed	\$9,681.6	\$203.7	(7.2%)	(1.1%)	(7.1%)	✓	
01/06/26	Praxis Precision Medicines, Inc.	CMO	\$7,215.2	\$575.1	(4.7%)	12.6%	19.4%	✓	
01/06/26	Crinetics Pharmaceuticals, Inc.	Marketed	\$4,571.9	\$350.1	(4.6%)	16.1%	(19.0%)	✓	
12/11/25	Immunovant, Inc.	RD	\$4,129.5	\$550.2	(10.9%)	18.1%	16.7%	✓	
12/10/25	Denali Therapeutics Inc.	CMO	\$3,395.4	\$200.0	(11.0%)	0.4%	18.0%	✓	
<b>Average (n=10)</b>			\$5,355.5	\$427.9	(6.0%)	7.8%	14.9%		
<b>Median (n=10)</b>			\$4,964.6	\$450.1	(6.3%)	6.6%	16.7%		

<b>Recent FOs with Market Cap \$500mm - \$2.5bn</b>									
04/01/26	Celldex Therapeutics, Inc.	CMO	\$2,080.9	\$300.0	(7.2%)	7.1%	7.1%	✓	
03/27/26	Zenas BioPharma, Inc.	CMO	\$1,271.1	\$100.0	(9.7%)	(8.9%)	7.3%	✓	
03/17/26	CytomX Therapeutics Inc	Marketed	\$1,148.8	\$250.0	(21.5%)	(17.0%)	(14.0%)	✓	
02/25/26	Vir Biotechnology Inc	Marketed	\$1,324.0	\$150.0	(10.4%)	9.6%	6.6%	✓	
02/25/26	Palvella Therapeutics Inc	Marketed	\$1,657.7	\$200.0	3.8%	18.7%	(1.2%)	✓	
02/25/26	Zura Bio Limited	CMO	\$619.0	\$125.0	(6.6%)	12.0%	(3.5%)		
02/24/26	Bicara Therapeutics Inc.	CMO	\$889.7	\$150.0	(1.5%)	9.4%	34.2%	✓	
02/18/26	COMPASS Pathways plc	Marketed	\$799.0	\$150.0	4.8%	3.3%	(27.6%)	✓	
02/11/26	Nektar Therapeutics Inc	Marketed	\$1,139.1	\$400.0	3.6%	22.4%	32.7%	✓	
02/10/26	Galecto, Inc.	CMO	\$938.0	\$275.0	(11.7%)	14.7%	32.1%		
<b>Average (n=10)</b>			\$1,186.7	\$210.0	(5.6%)	7.1%	7.4%		
<b>Median (n=10)</b>			\$1,143.9	\$175.0	(6.9%)	9.5%	6.8%		

<b>Recent FOs with Market Cap &lt;\$500mm</b>									
04/02/26	Adagene Inc.	RD	\$218.4	\$70.0	(18.7%)	6.4%	6.4%	✓	
03/23/26	Sol-Gel Technologies Ltd.	RD	\$186.0	\$33.1	8.8%	11.1%	10.4%		
03/19/26	Humacyte, Inc.	RD	\$198.5	\$20.0	(24.5%)	6.8%	(19.7%)	✓	
03/17/26	SAB Biotherapeutics Inc	CMO	\$207.4	\$85.0	(5.4%)	(3.9%)	0.8%	✓	
03/02/26	MAIA Biotechnology, Inc.	CMO	\$80.0	\$30.0	(27.5%)	0.7%	(11.3%)		
02/25/26	Larimar Therapeutics, Inc.	CMO	\$479.5	\$100.0	(16.0%)	10.4%	(4.2%)	✓	
02/20/26	TriSalus Life Sciences, Inc	CMO	\$230.8	\$40.0	(11.1%)	32.9%	3.4%		
02/19/26	Candel Therapeutics, Inc.	CMO	\$326.6	\$100.0	(8.4%)	9.2%	(8.3%)	✓	
02/19/26	Eupraxia Pharmaceuticals Inc	CMO	\$412.9	\$55.0	(14.2%)	16.0%	2.4%		
02/12/26	OKYO Pharma Limited	CMO	\$88.0	\$20.0	(14.7%)	(5.4%)	(9.2%)	✓	
<b>Average (n=10)</b>			\$242.8	\$55.3	(13.2%)	8.4%	(2.9%)		
<b>Median (n=10)</b>			\$212.9	\$47.5	(14.5%)	8.0%	(1.7%)		
<b>Average (n=30)</b>			\$2,261.7	\$231.1	(8.3%)	7.8%	6.5%		
<b>Median (n=30)</b>			\$1,143.9	\$175.0	(8.8%)	8.2%	4.8%		

**Historical biopharma FOs**



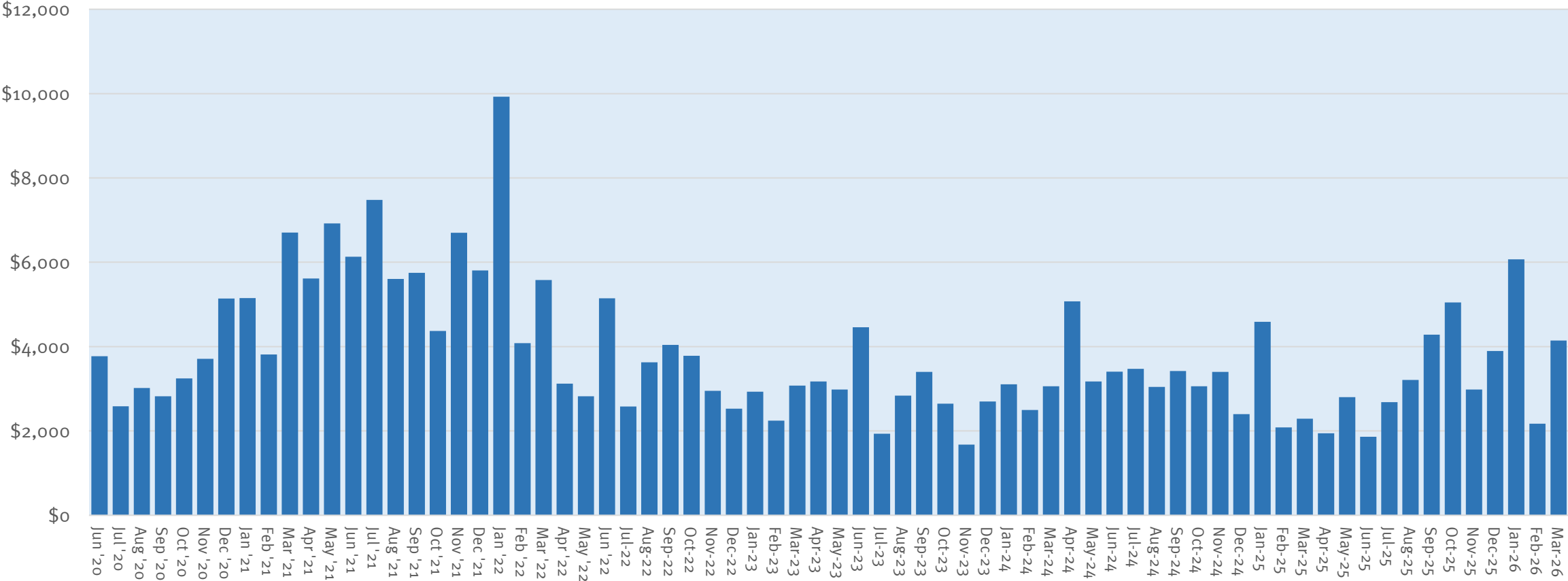
**Majority of FOs have some confidential marketing component**



# Venture Privates Market Volume in 2026 Up 25% vs. 2025

The first three months of 2026 saw venture equity volume average \$1 billion a week. Compare this to \$770 million a week in 2025. We are seeing more deals this year than last. Importantly, the size distribution of deals is widening – implying that more private companies are getting access to the market than before.

Monthly Private Equity Placement (\$volume, \$mm), Jun 2020 to Mar 2026

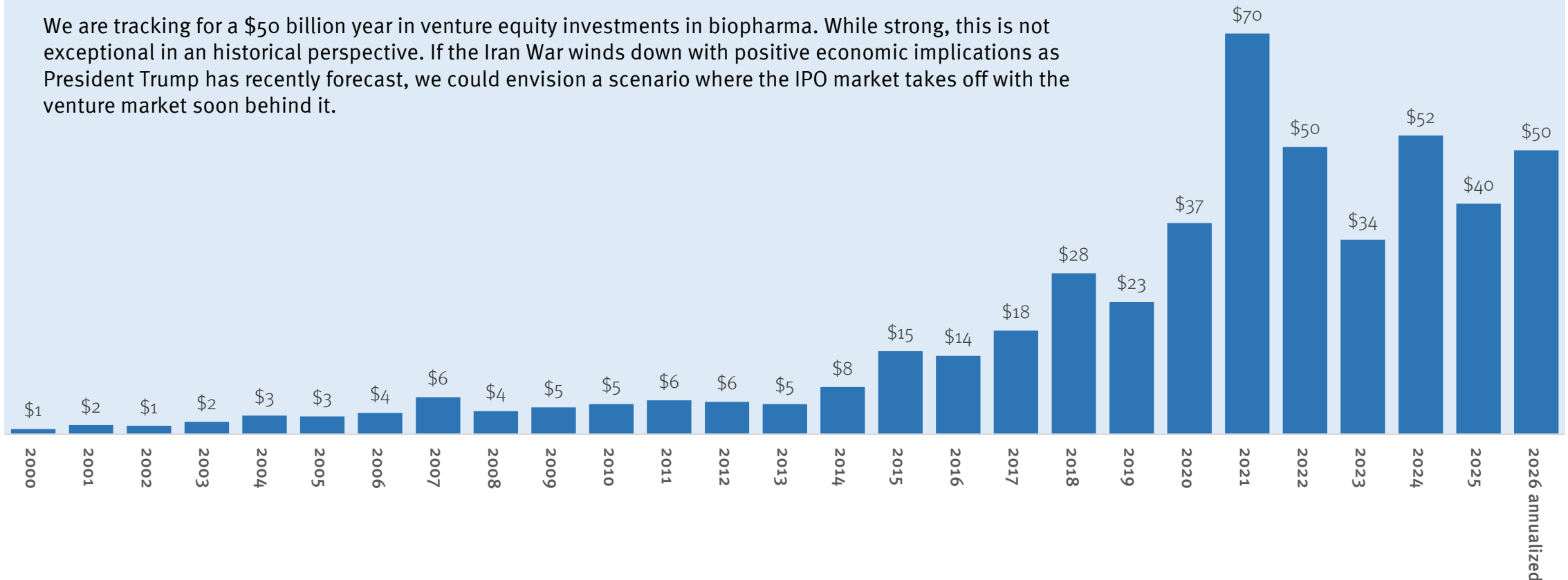


Source: Data from CapitalIQ, Crunchbase.

# This is Not an Exceptional Volume Year (At Least Yet) in the Biopharma Venture Privates Field

Venture Privates in the Biopharma Sector, 2000 - 2026 (annualized)  
(\$ Billions, Worldwide)

We are tracking for a \$50 billion year in venture equity investments in biopharma. While strong, this is not exceptional in an historical perspective. If the Iran War winds down with positive economic implications as President Trump has recently forecast, we could envision a scenario where the IPO market takes off with the venture market soon behind it.



# We are Seeing a Reversal of the Trend Toward “Mega” Venture Equity Financings in Biotech

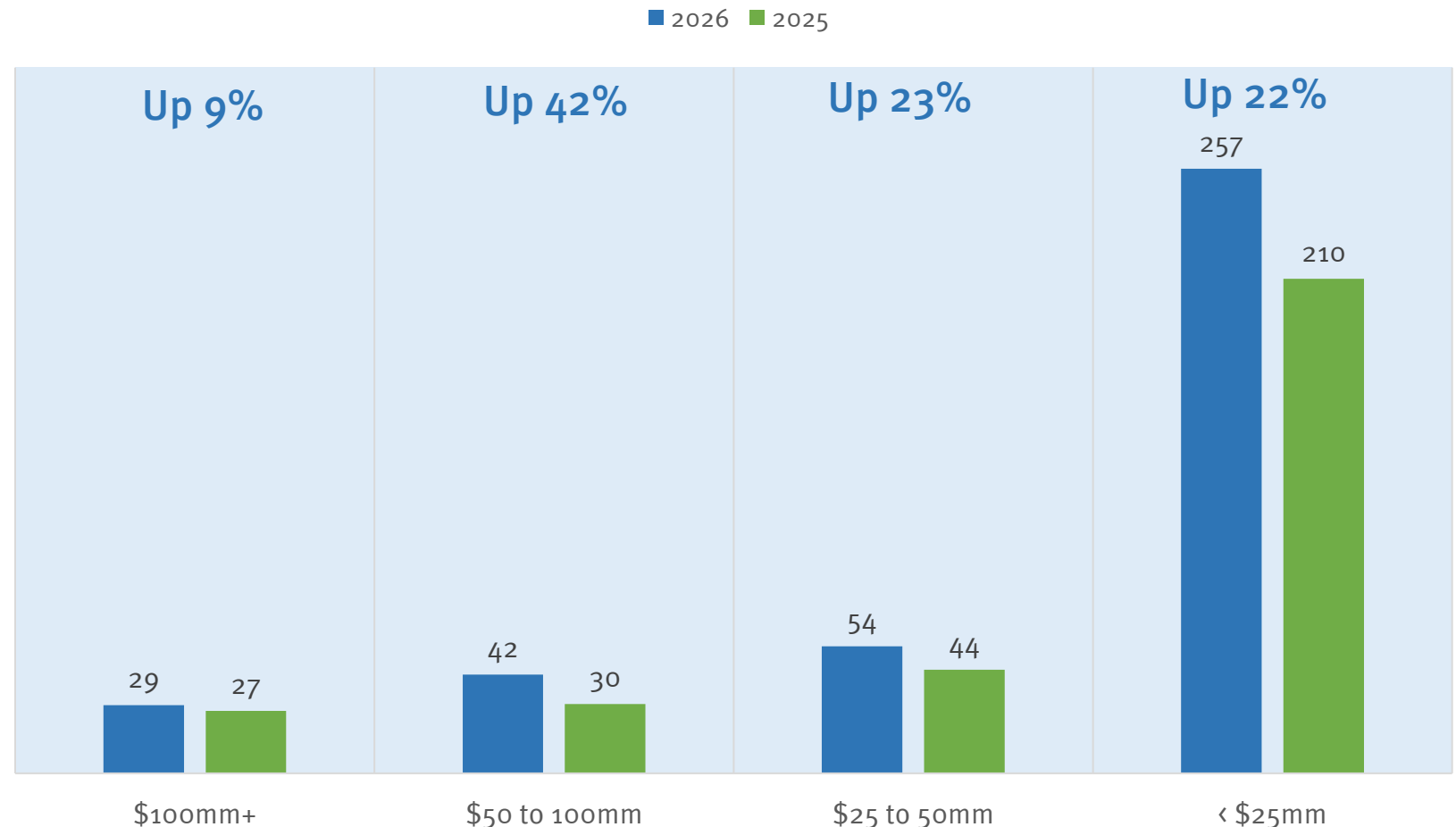
The count of venture biopharma deals in Q1 2026 is up versus the pace in 2025 for all size categories.

However, the trend towards more and more “mega deals” has been reversed in 2026.

The count of venture equity investments in the \$50mm to \$100mm range is up 42% this year. And there has been a 20%+ increase in the pace of sub-\$50mm deals.

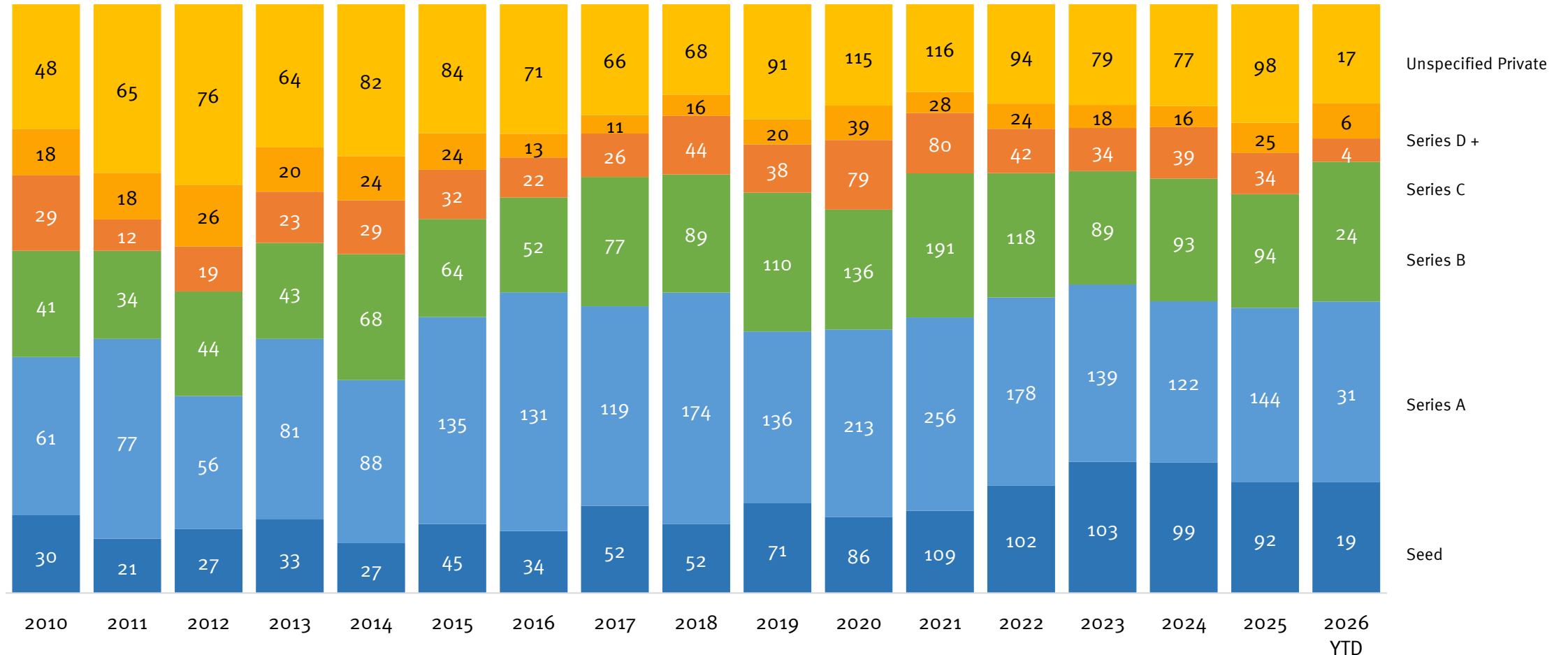
This is a healthy sign pointing to greater risk taking and less of a “have” and “have-not” world for biotech entrepreneurs.

Count of Biopharma Venture Private Deals/Quarter (2026 vs. 2025) by Deal Size



# The Distribution of Biopharma Venture Deals by Series Type Has Been Steady in Recent Years

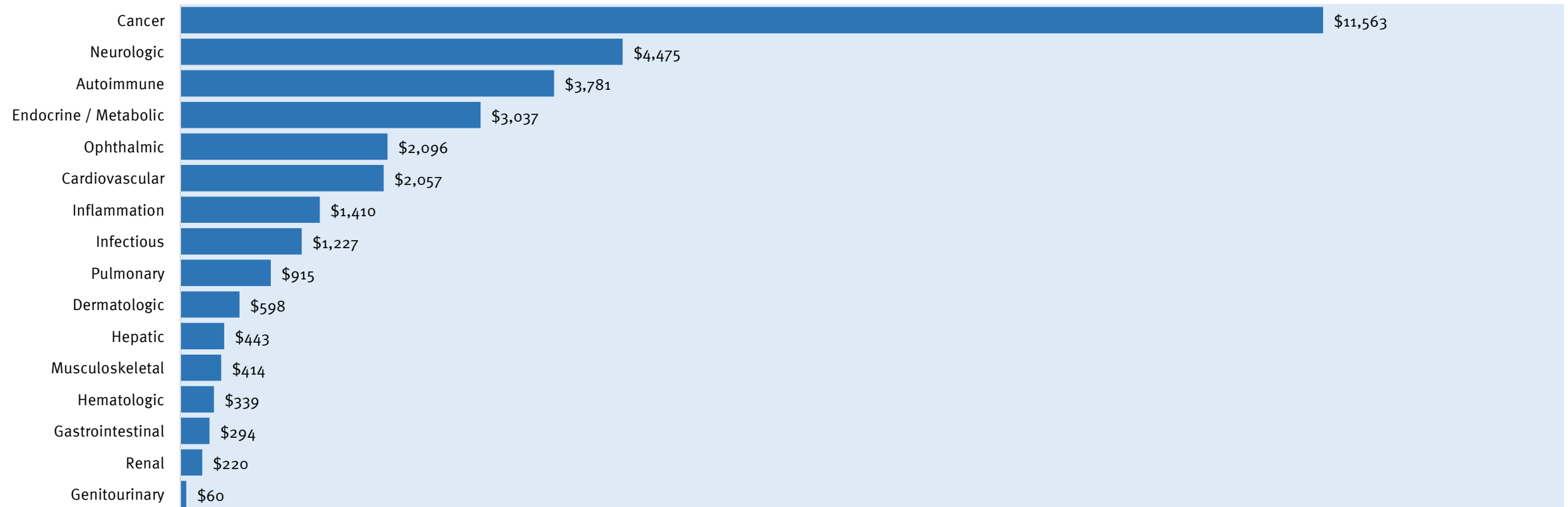
Count of Global Biopharma Venture Rounds by Series, 2010 to 2026



Source: DealForma Database

# Oncology Theme Continues to Dominate Biopharma Venture Equity Financings

Top Therapeutic Areas for Biopharma Venture Equity Investments, By Total Value (\$mm), Jan 2025- Mar 2026



Source: DealForma Database

# OpenAI Sets Tech Company Private Financing Record



Today, we closed our latest funding round with \$122 billion in committed capital at a post money valuation of \$852 billion. OpenAI is becoming the core infrastructure for AI, making it possible for people around the world and businesses, big and small, to just build things. The broad consumer reach of ChatGPT creates a powerful distribution channel into the workplace, where demand is rapidly shifting from basic model access to intelligent systems that reshape how businesses operate. Developers build on and expand the platform by leveraging our APIs, and Codex is transforming how developers turn ideas into working software. Durable access to compute is the strategic advantage that compounds across the entire system: it advances research, improves products, expands access, and structurally lowers the cost of delivery at scale. Together, consumer adoption, enterprise deployment, developer usage, and compute form a reinforcing flywheel that is translating capability into economic impact.

OpenAI was the fastest technology platform to reach 10 million users, the fastest to 100 million users, and soon the fastest to 1 billion weekly active users. Within a year of launching ChatGPT, we reached \$1B in revenue. By the end of 2024 we were generating \$1B per quarter. We are now generating \$2B in revenue per month. At this stage, we are growing revenue four times faster than the companies who defined the Internet and mobile eras, including Alphabet and Meta.

This is commercial scale, and it is mission scale. The fastest way to widen the benefits of AI is to put useful intelligence in people's hands early and let that access compound globally. AI is driving productivity gains, accelerating scientific discovery, and expanding what people and organizations can build. This funding gives us the resources to continue to lead at the scale this moment demands.

Our ambition is matched by the commitment of the partners backing us. The round was anchored by our strategic partners Amazon, NVIDIA, and SoftBank, with continued participation from our long-term partner, Microsoft. SoftBank co-led the round alongside a16z, D. E. Shaw Ventures, MGX, TPG, and accounts advised by T. Rowe Price Associates, Inc.

# Biotech VCs Move Upstream in China's Scientific Pipelines as Competition Grows Fiercer

Brian Yang, *Stat+*, March 31, 2026 (Excerpt)

U.S. venture capital firms are no longer waiting for Chinese biotech assets to surface before investing in them — they're moving upstream, embedding themselves inside labs and courting scientists before they publish their research. In some cases, they're vying against Chinese VCs urging scientists not to publish at all.

As multinational drugmakers flood China in search of deals, competition is intensifying, and valuations are rising sharply, according to VCs and other observers. That pressure is forcing venture capital firms to move earlier — teaming up with local partners to tap scientific discoveries before they reach the market.

Among those VC firms is RA Capital, which has invested in some of the most transformative names in Chinese biotech, including Legend Biotech, which obtained its first Food and Drug Administration approval with its cell therapy Carvykti in 2022, and Gracell Bio, which was acquired by AstraZeneca in a \$1.2 billion deal in 2024.

Amid U.S. skepticism about clinical data generated in China, a team from RA Capital decided to take a closer look at the country's scientific enterprise and traveled to Beijing in late 2025, managing director Tess Cameron told STAT in an interview. There the team visited the National Cancer Hospital, which is affiliated with the Chinese Academy of Medical Science. The visit shifted RA Capital's view. Despite variability among hospitals when it comes to how data are generated, outright fabrication is unlikely, concluded Cameron. "We now look at the data really seriously," she said.

Source: <https://www.statnews.com/2026/03/31/venture-capital-moves-upstream-chase-china-biotech-deals-pre-publication/>



**Tess Cameron**  
Managing Director, RA Capital

# Bruce Booth on the Importance of People (and Luck) in Biotech Venture Investing

Bruce Booth, Atlas Venture, *Nature Biotechnology*, March 17, 2026 (Excerpt)

“Creating high-functioning interdisciplinary teams is critical to success for any biotech: biology and chemistry, operations and business development, finance and public relations, and so on. All of these skill sets are needed. Over time, as a biotech matures into the clinic and eventually commercialization (if not acquired), the team needs to evolve and bring different capabilities into the journey.

One of the biggest observations I have made over time is the power of luck in our business, and it is important to acknowledge it. While I firmly believe that chance favors the prepared mind, the high false positive rates of science and stochastic nature of biotech outcomes mean that randomness and luck have outsized impacts on success (and failure). Once you appreciate that, there are several takeaways. Be humble. Don't overindex on one-hit-wonder rock stars. Recognize that great scientific leaders aren't determined by outcomes alone. Hard work helps to make your own luck, but, paraphrasing Nassim Taleb, don't be fooled by randomness.”

Source: <https://www.nature.com/articles/s41587-026-03027-1>



Bruce Booth  
Partner, Atlas Venture

# Blackstone Announces Final Close of Record \$6.3 Billion Life Sciences Fund

**NEW YORK & CAMBRIDGE, MA – March 30, 2026** – Blackstone (NYSE: BX) today announced the final close of Blackstone Life Sciences VI (“BXLS VI”). BXLS VI was oversubscribed and closed at its hard cap of \$6.3 billion of total capital commitments. It is the largest life sciences private fund ever raised and is nearly 40% larger than its predecessor vehicle.

Nicholas Galakatos, Ph.D., Global Head of Blackstone Life Sciences (“BXLS”), said, “We are grateful to the BXLS VI investors for their strong support of our strategies and the firm’s enduring conviction in the life sciences.” He added, “Our partnerships with global leaders have produced 34 regulatory approvals of innovative medicines and devices. This track record highlights how we work successfully with industry trailblazers to help bring their most important products to patients around the world.”

Blackstone launched its dedicated BXLS platform in 2018 to invest across the life cycle of companies and products in the key life science sectors. With \$15 billion in assets under management as of Q4 2025, BXLS leverages the team’s deep domain expertise, industry relationships globally and scale capital to help finance the development and commercialization of new medicines and technologies with the potential to transform patients’ lives. These include blockbuster medicines such as LEQVIO®, AMVUTTRA®, and IMBRUVICA® and devices like MiniMed Flex™.

The BXLS’ franchise 86% approval success rate for Phase III assets has outperformed the industry’s average and led to strong performance for the benefit of its investors.

Source: <https://www.blackstone.com/news/press/blackstone-announces-final-close-of-record-6-3-billion-life-sciences-fund-the-largest-private-fund-dedicated-to-life-sciences/>

**Blackstone**  
LIFE SCIENCES

**BXLS has committed nearly \$2 billion**  
in new investments over the past 12 months

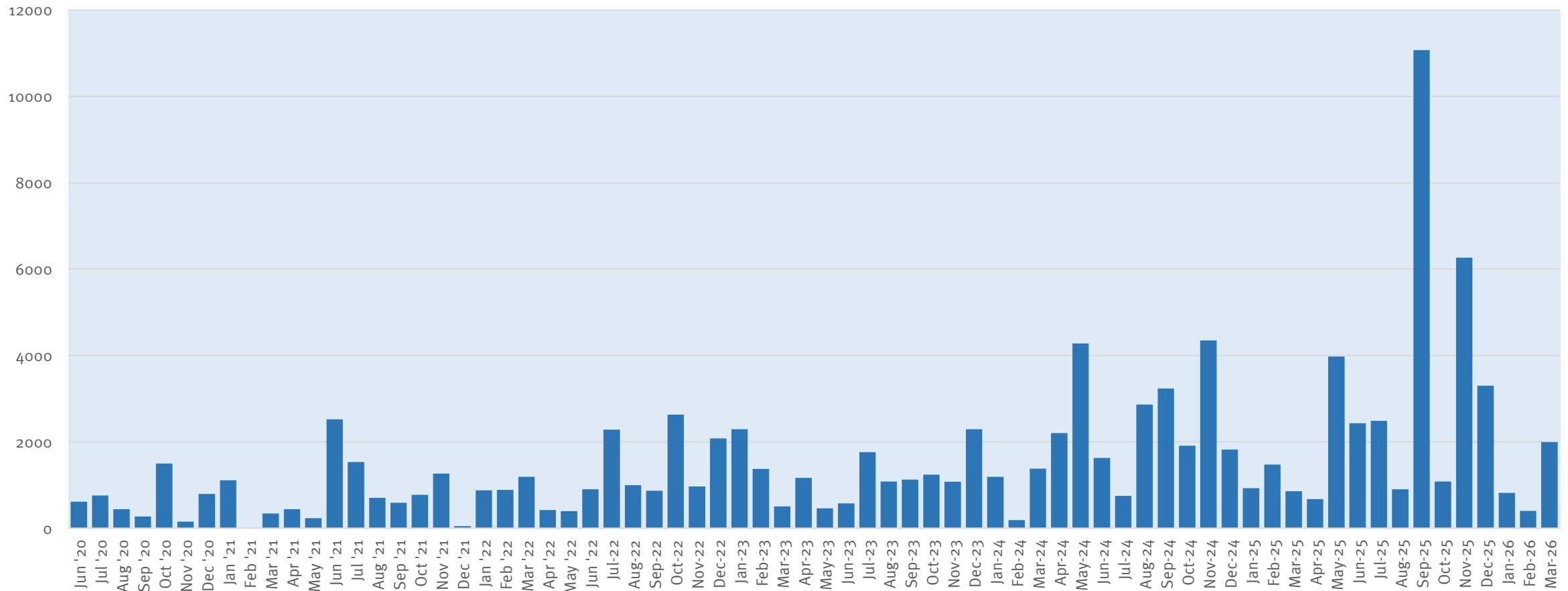
A representative list of BXLS transactions is shown below:

- MERCK** Research and Development Funding Agreement with Blackstone Life Sciences for Sacituzumab Tirumotecan (sac-TMT)  
Acute Myeloid Leukemia  
Co-funding Agreement with Blackstone Life Sciences
- TEVA** \$400M Strategic Growth Capital Agreement to Advance **duvakitug**
- \$2 Billion** Strategic Financing Collaboration with **Alynlam**
- NOVARTIS** Up to \$3.1B Acquisition of Anthos Therapeutics  
Agreement for Anthos to be Acquired by Novartis

# Global Biopharma Private Debt Placement Volume Modest in Q1 2026

Private debt and royalty monetization volume in Q1 averaged \$1 billion a month. Compare this to an average of \$3 billion a month in 2025. While issues in the private credit realm may have had some impact here, we think it was more the reopening of public equity markets that explained the lower issuance volume this year than last.

Private Debt Issuance (\$mm volume), Jun 2020 to Mar 2026



Source: Data from CapitalIQ, Crunchbase.

# Risk Spreads for Investment Grade Bonds Low by Historic Standards

Investment Grade Bond Yield Spread (Single A U.S. Bonds Minus Treasury Spot Rate), April 1, 2016 to April 2, 2026



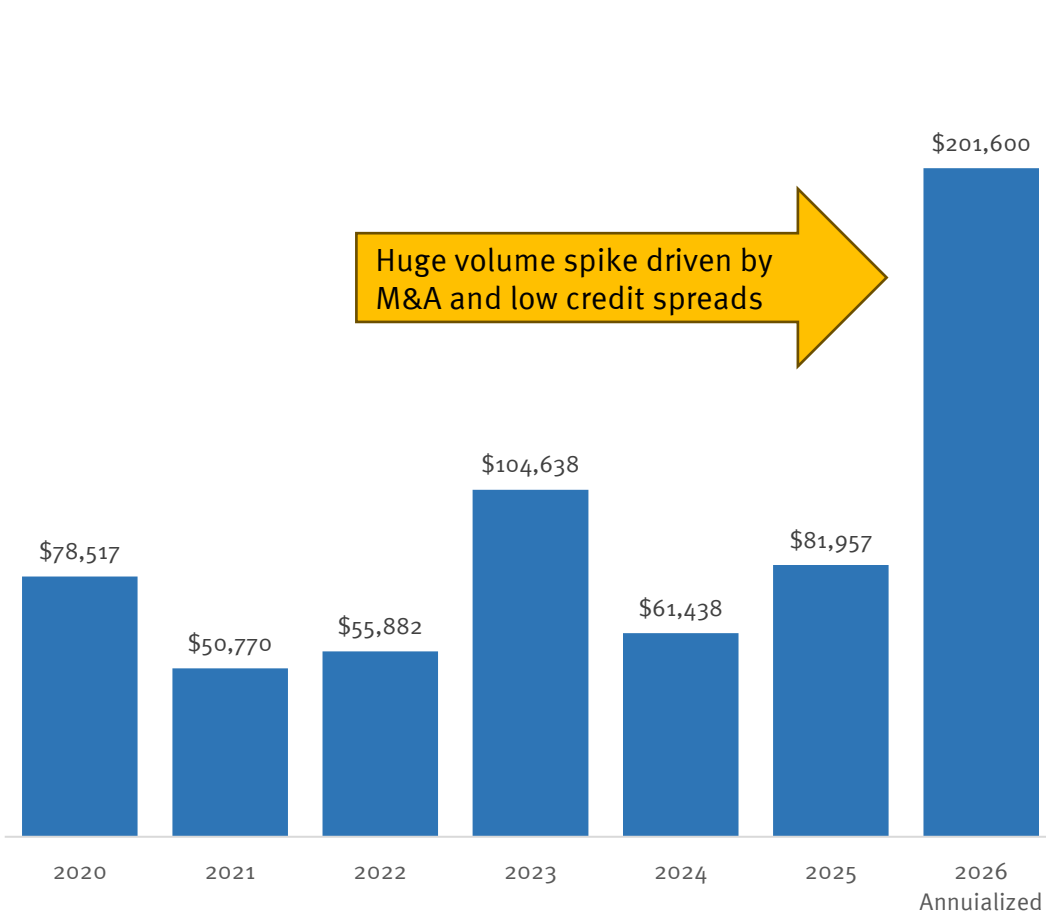
Investment grade bond spreads hit a ten-year low in February 2026



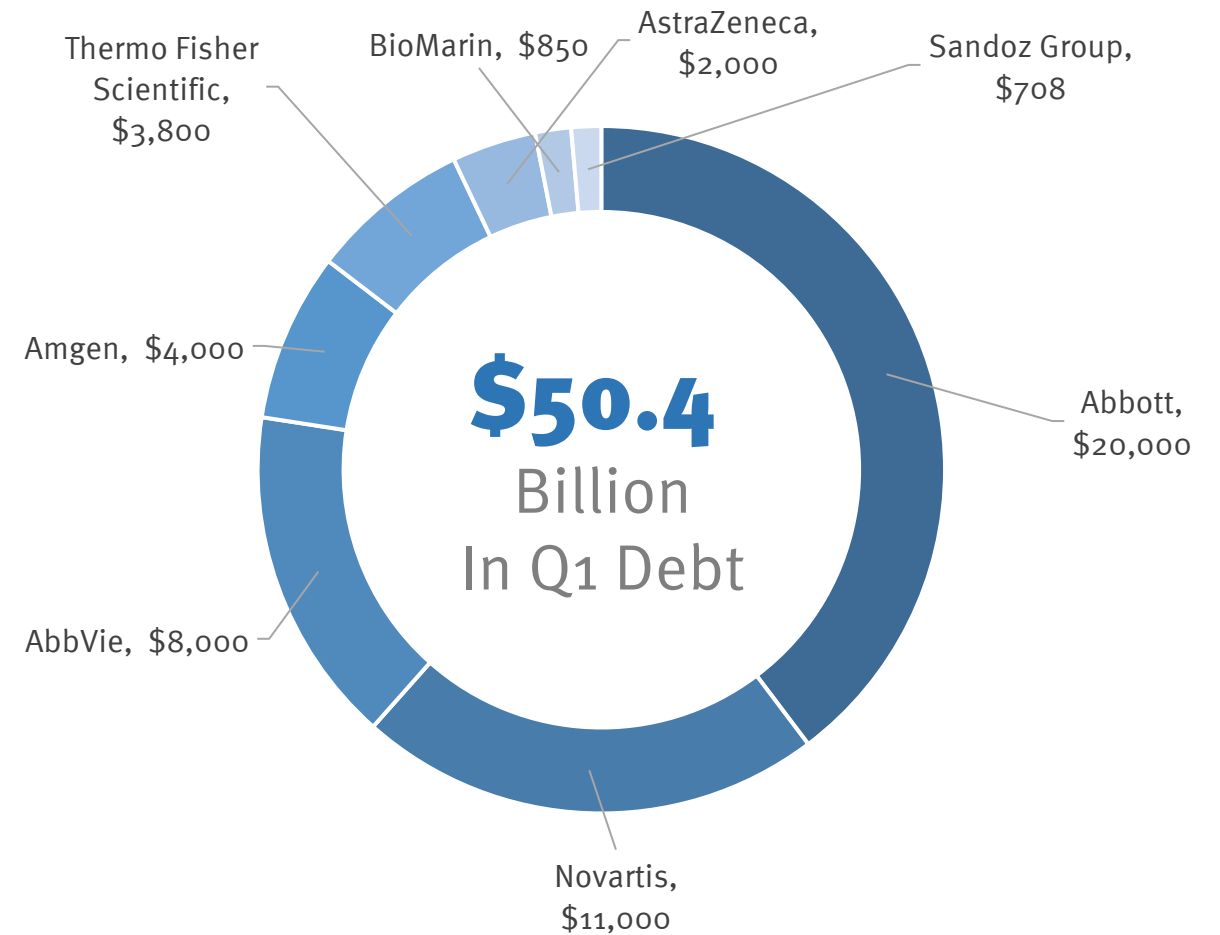
# Public Debt Issuance in Life Sciences Through the Roof in 2026

Low credit spreads and M&A activity (particularly Abbott's purchase of Exact Sciences and Novartis' acquisition of Avidity) led to exceptional Q1 2026 investment grade debt issuance volume in the life sciences sector.

Public Debt Issuance, Life Sciences Sector  
2020 to 2026 \$mm



Top Life Sciences Issuers of Investment Grade Debt in Q1 2026 (\$Millions)



# M&A Update

Lilly Gateway Labs, La Jolla, California, March 2026

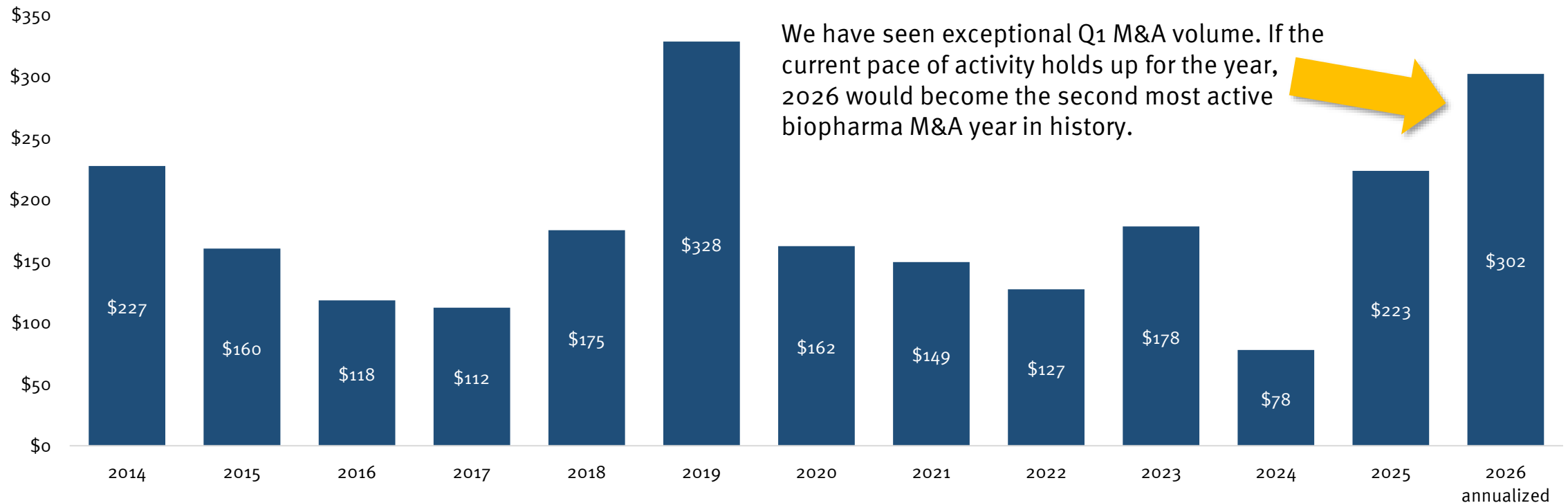


# We are Tracking to Have the Second Most Active Year in Biopharma M&A History

We are tracking for 2026 to generate well over \$250 billion in M&A volume. This would make this year the second most active in the history of the biopharma sector. What is exceptional is that there have been zero transactions over \$10 billion in size this year – at least so far. In contrast, the most active historical year (2019) saw two large horizontal mergers of \$50 billion or more (AbbVie / Allergan and BMS / Celgene).

**M&A Volume in the Biopharma Sector, 2014 - 2025**

(\$ Billions, Worldwide)



Source: S&P, CapitalIQ and DealForma. Note: The upfront payments in Orna and Ouro were not fully disclosed.

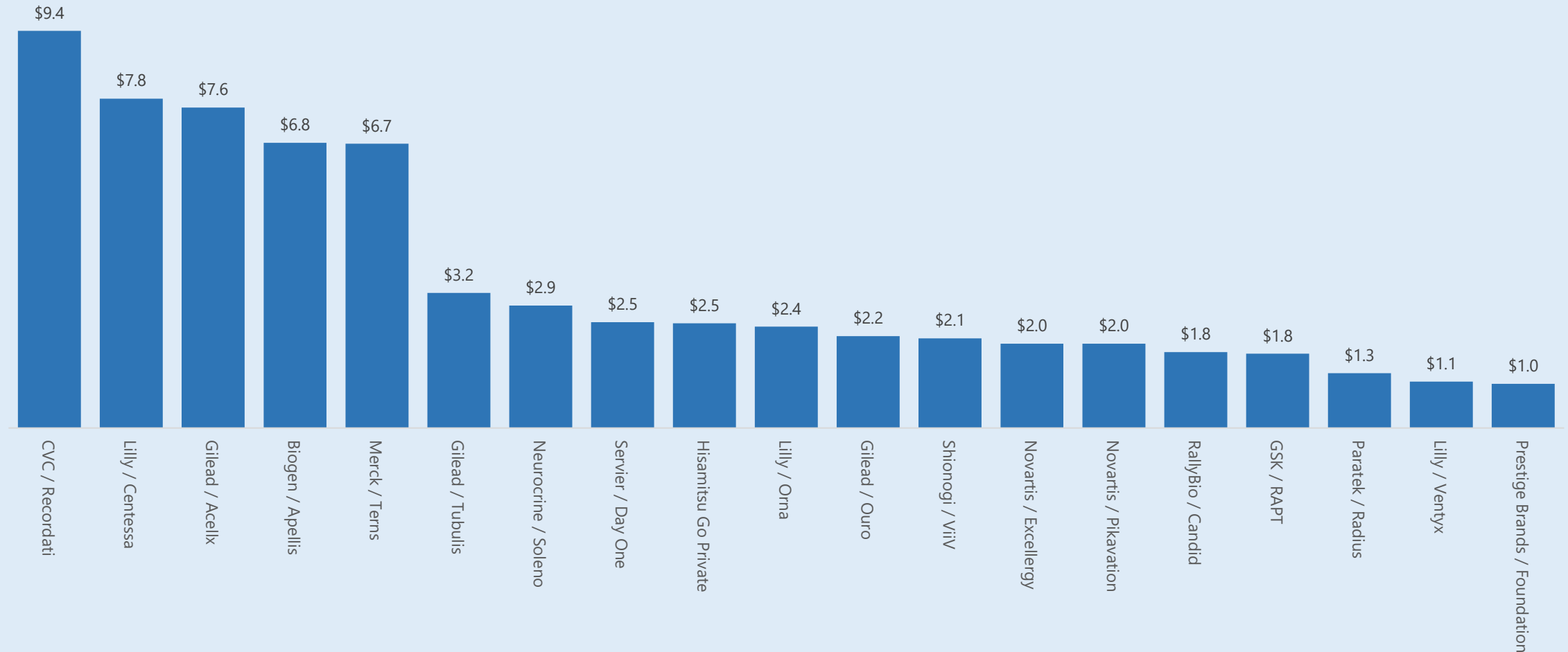
# Recent M&A Activity Is Replenishing Buyside Capital

## Top Buyside Holders (latest SEC filings) in \$Millions Related to Acquisitions of \$1bn or More in Last Six Months

#	Institutional Holders	Total Holdings (\$mm, current)	Akero	Amicus	Apellis	ArcellX	Avadel	Avidity	Centessa	Cidara	Day One	Dynavax	RAPT	Soleno	Terns	Ventyx
1	Fidelity	\$2,771	\$50	\$7	\$1	\$410	\$3	\$1,165	\$341	\$172	\$123	\$3	\$14	\$428	\$54	<\$1
2	Janus	\$2,461	\$364	\$36	\$9	\$106	\$206	\$887	\$156	\$138	<\$1	<\$1		\$380	\$179	
3	Avoro	\$2,354	\$189	\$218	\$501			\$508	\$553					\$154	\$231	
4	Wellington	\$2,032	\$184	\$415	\$522	\$25	<\$1	\$666	\$2			<\$1		\$176	\$42	
5	T. Rowe Price Associates	\$1,612	\$244	\$15	\$4	\$185	<\$1	\$778	\$149	\$2	\$2	\$2		\$176	\$52	\$3
6	RTW	\$1,456	\$296		\$314			\$693	\$68				\$85			
7	RA Capital	\$1,416				\$146		\$523		\$747						
8	Medicxi Ventures	\$1,299							\$1,137				\$162			
9	T. Rowe Price IM	\$1,273			<\$1	\$1,214		\$59	<\$1							
10	Deep Track	\$1,121	\$164		\$318				\$76	\$55		\$244	\$44	\$53	\$167	
11	Adage CM	\$1,093	\$16					\$110	\$429	\$244					\$294	
12	Vestal Point	\$1,037		\$141		\$336				\$111	\$112				\$239	\$98
13	Paradigm BioCapital	\$951				\$658				\$250					\$43	
14	Point2	\$808	\$146	\$105	\$25		\$4			\$338	\$3	\$3	<\$1		\$30	\$154
15	Citadel	\$689	\$59	\$119	\$25	\$155	\$15		\$7	\$64		\$8			\$147	\$90
16	Vivo Capital	\$646	\$23				\$50			\$290					\$283	
17	Millennium	\$614	\$17	\$171	\$39	\$1	<\$1	\$17	\$71		\$29	\$70	\$2	\$66	\$52	\$79
18	Bain Capital	\$554								\$554						
19	General Atlantic	\$542	\$310						\$232							
20	TCG Crossover	\$496							\$163	\$223			\$95			\$15
21	GSAM	\$493	\$41	\$55	\$8	\$77	\$8	\$82	\$30	\$1	\$32	\$29	\$4	\$50	\$56	\$20
22	Woodline	\$489	\$133	\$16	\$22	\$85	\$17	\$46	\$22	\$14				\$59	\$73	\$2
23	Pictet	\$457	\$53	\$98	\$16	\$39	<\$1	\$70			\$64	<\$1		\$33	\$84	
24	OrbiMed	\$443	\$11	\$24	\$100			\$131					\$63		\$114	
25	Commodore	\$440							\$38	\$260				\$64	\$78	
26	Perceptive	\$432	\$49	\$92		\$169			\$111						\$11	
27	Invus	\$424	\$17		\$106			\$80	\$153				\$34	\$34		
28	Polar Capital	\$413			\$152		\$74	\$127						\$60		
29	BlackRock	\$403	\$27	\$48	\$17	\$60	\$10	\$61		\$21	\$39	\$12	<\$1	\$28	\$77	\$3
30	Ikarian	\$399	\$15		\$4			<\$1	\$1	\$138			\$49		\$108	\$84
31	Marshall Wace	\$372	\$77		\$41	<\$1		\$4	\$8	\$52		\$32	<\$1		\$47	\$111
32	NEA	\$350				\$350										
33	JPMorgan AM (US & UK)	\$330	\$14	\$21	\$2	\$163	<\$1	\$36		\$5	<\$1	\$6			\$83	
34	Affinity	\$300				\$60			\$23						\$29	\$188
35	Franklin	\$289	\$1	<\$1	<\$1	\$1	<\$1	\$3	\$90	\$3	\$1	\$1		\$44	\$145	
36	Farallon	\$282	<\$1	<\$1		<\$1			\$204	\$44					\$34	
37	Access Biotech	\$278									\$278					
38	SR One	\$270				\$270										
39	BVF	\$263								\$263						
40	Logos	\$258	\$65			\$13		\$68	\$8	\$42	\$6			\$16	\$40	

# Nineteen \$1 Billion Plus M&A Transactions Have Been Announced Through Apr 7<sup>th</sup>, 2026

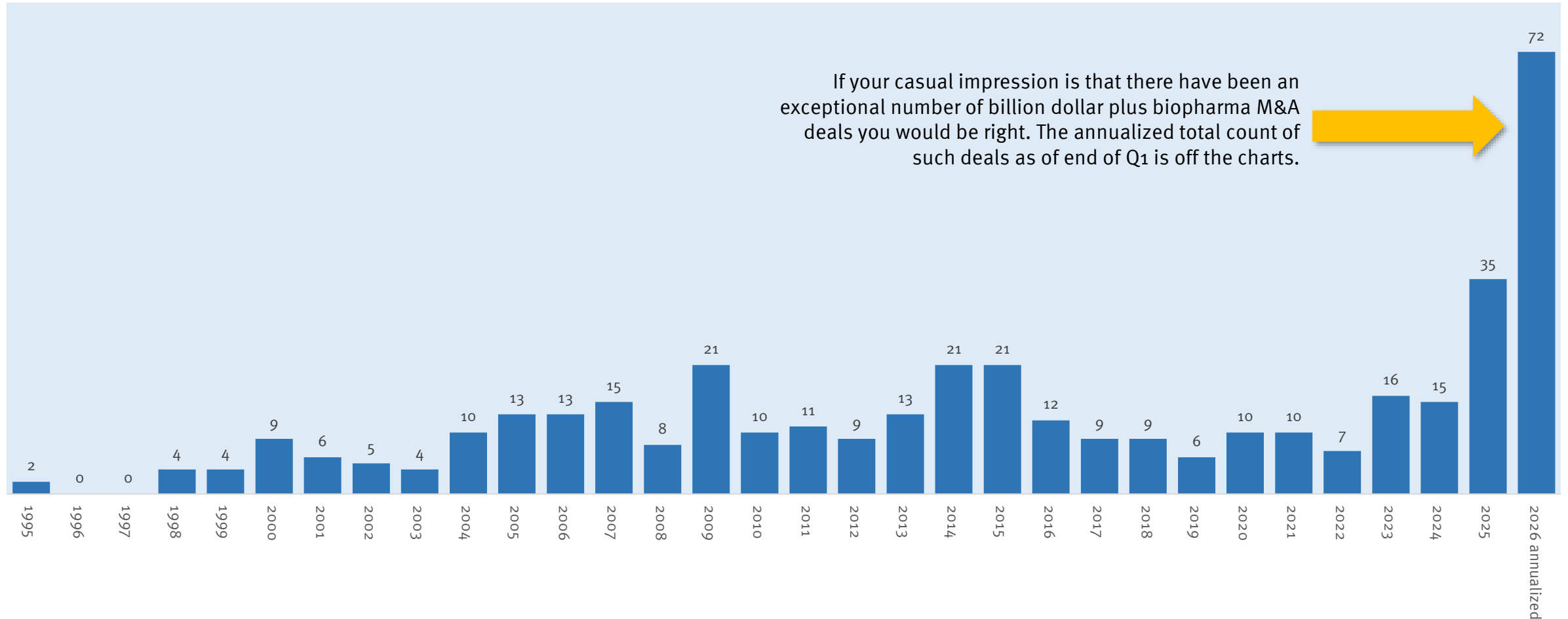
Upfront Consideration in \$1bn+ Biopharma M&A Deals from Jan 1, 2026 to Apr 7, 2026



Source: S&P, CapitalIQ and Stifel Investment Banking Research.  
 Note: The upfront payments in Orna and Ouro were not fully disclosed.

# This Year is Seeing a Record Count of \$1bn+ Biopharma M&A Deals

Number of Acquisitions of Biopharma Companies for \$1 Billion or More, 1995 to 2026

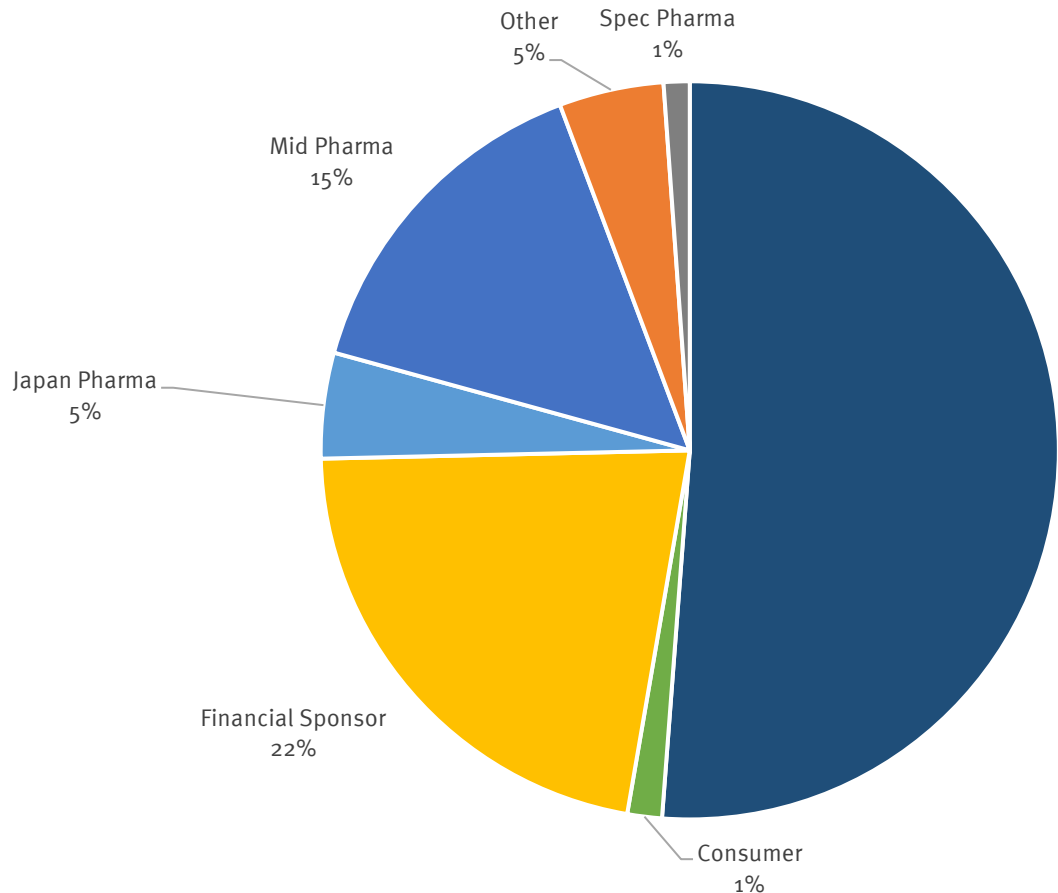


Source: S&P, CapitalIQ and Stifel Investment Banking Research.

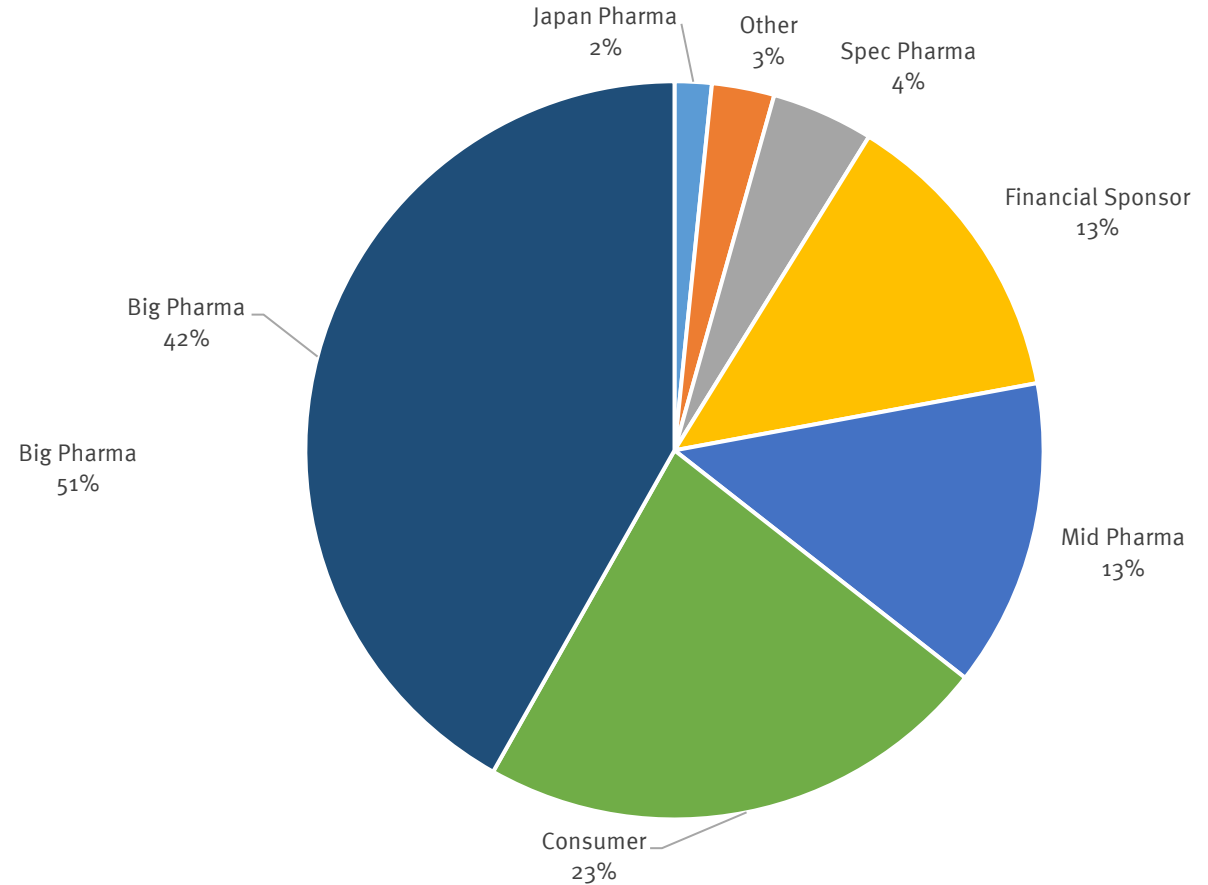
# Big Pharma and Financial Sponsors More Important in 2026

Big pharma accounted for 42% of the money spent last year on M&A. This year, big pharma has accounted for 51% of M&A dollars. Sponsor spend is also up rather substantially in 2026 as is Japan Pharma.

Buyer Types in Q1 2026 by Transaction Value (N=32)



Buyer Types in 2025 by Transaction Value (N=84)

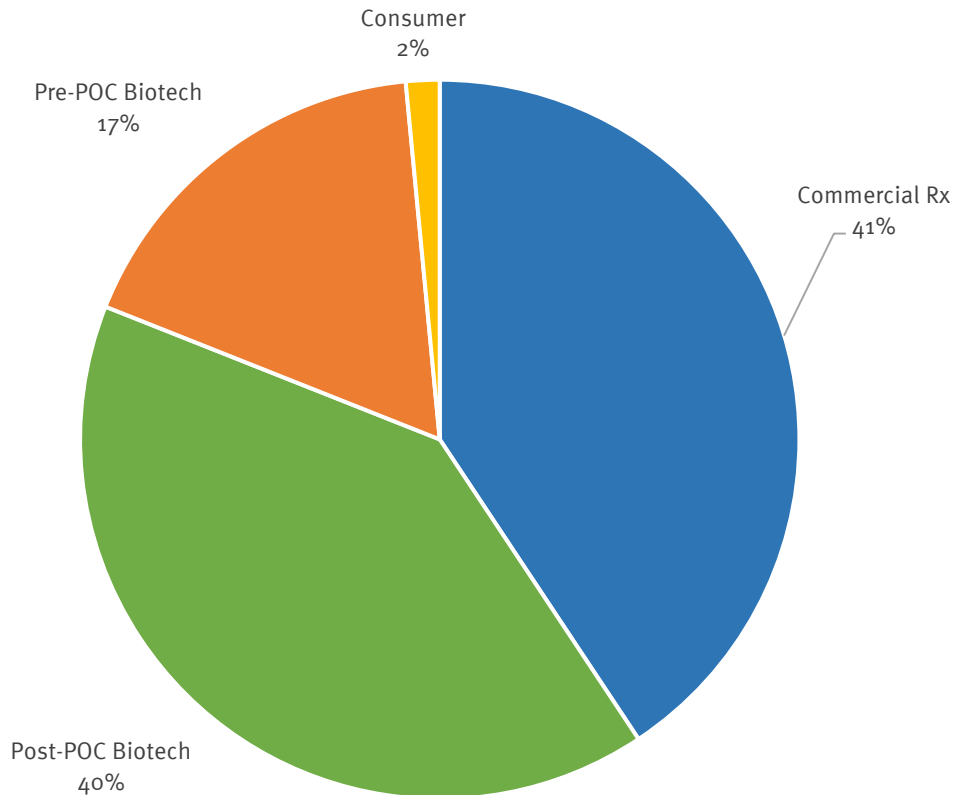


Source: S&P, CapitalIQ and DealForma. transactions for \$100mm upfront or more were included in this analysis. Manufacturing transactions and terminated transactions excluded from analysis.

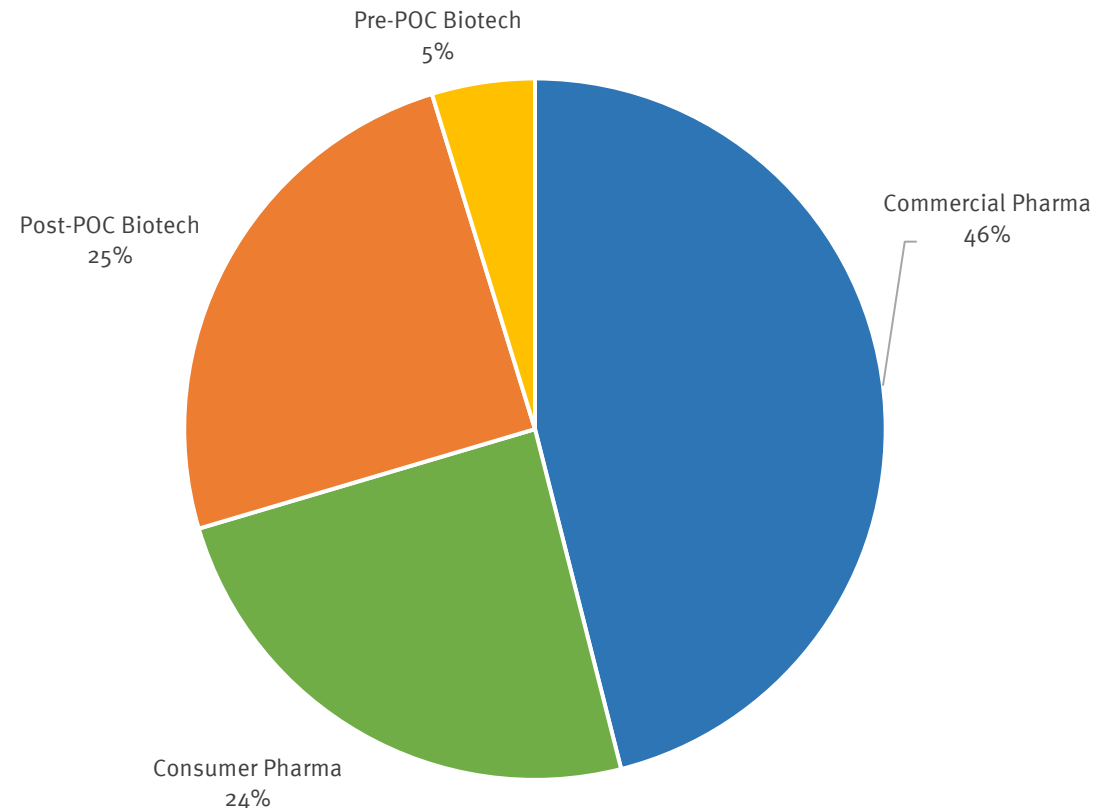
# We Are Seeing Much More Early Biotech M&A in 2026

We had forecast in our January 2026 issue that we would see more early biotech dealmaking in 2026 as commercial and late-stage stories get more expensive. Indeed, this has transpired. Seventeen percent of M&A dollars spent in 2026 thus far have been for pre-POC biotech whereas only five percent of dollars in 2025 were for Pre-POC biotech. Less than half of M&A in 2026 has been for commercial stage pharma or consumer. In contrast, in 2025, 70% of all dollars spent were for commercial stage companies. With far higher prevalent valuations in 2026 we are seeing the first year in several when pharma is favoring pre-commercial M&A to build pipeline.

**Seller Types in Q1 2026 by Transaction Value (N=32)**

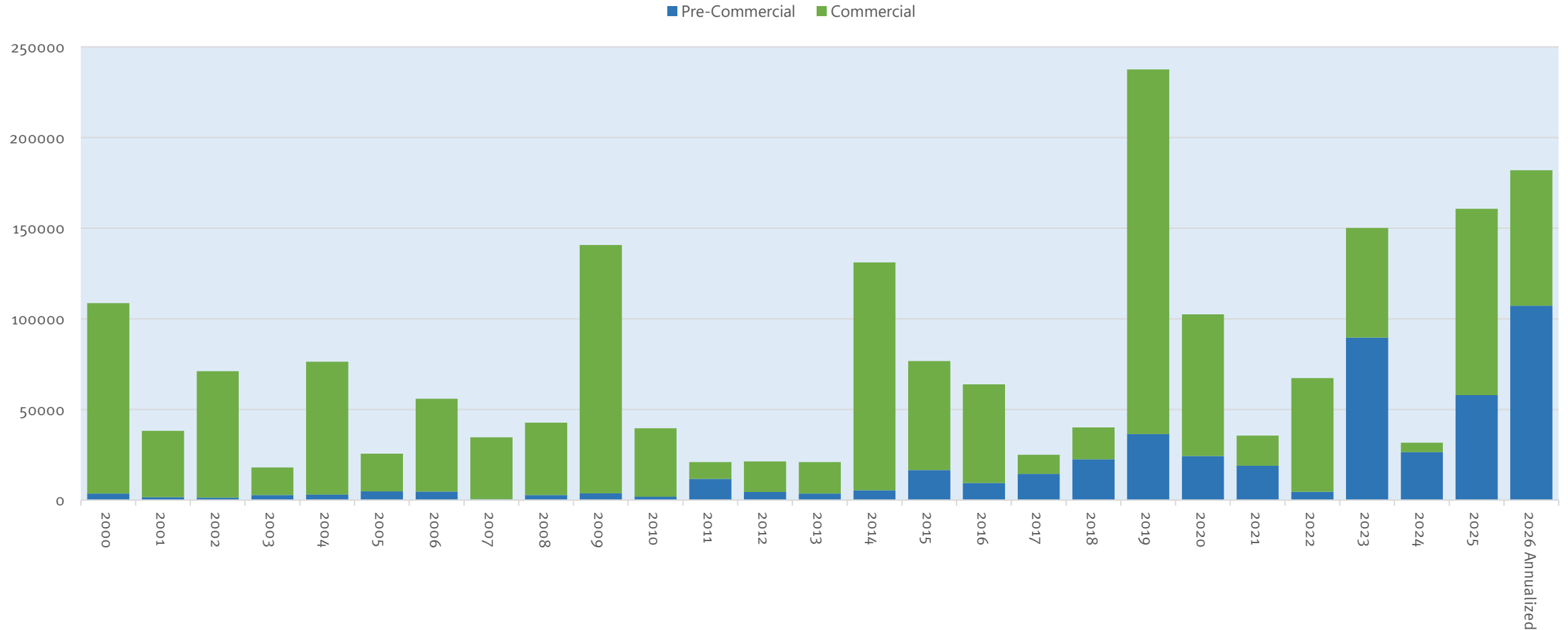


**Seller Types in 2025 by Transaction Value (N=84)**



# We are Tracking for a Record Year for Pre-Commercial Biotech M&A in 2026

**Dollar Volume of Biopharma M&A Involving Public Targets by Stage**  
 (Commercial or Not, 2000 to 2026 YTD, North America / EU Public Targets, Value > \$75mm)

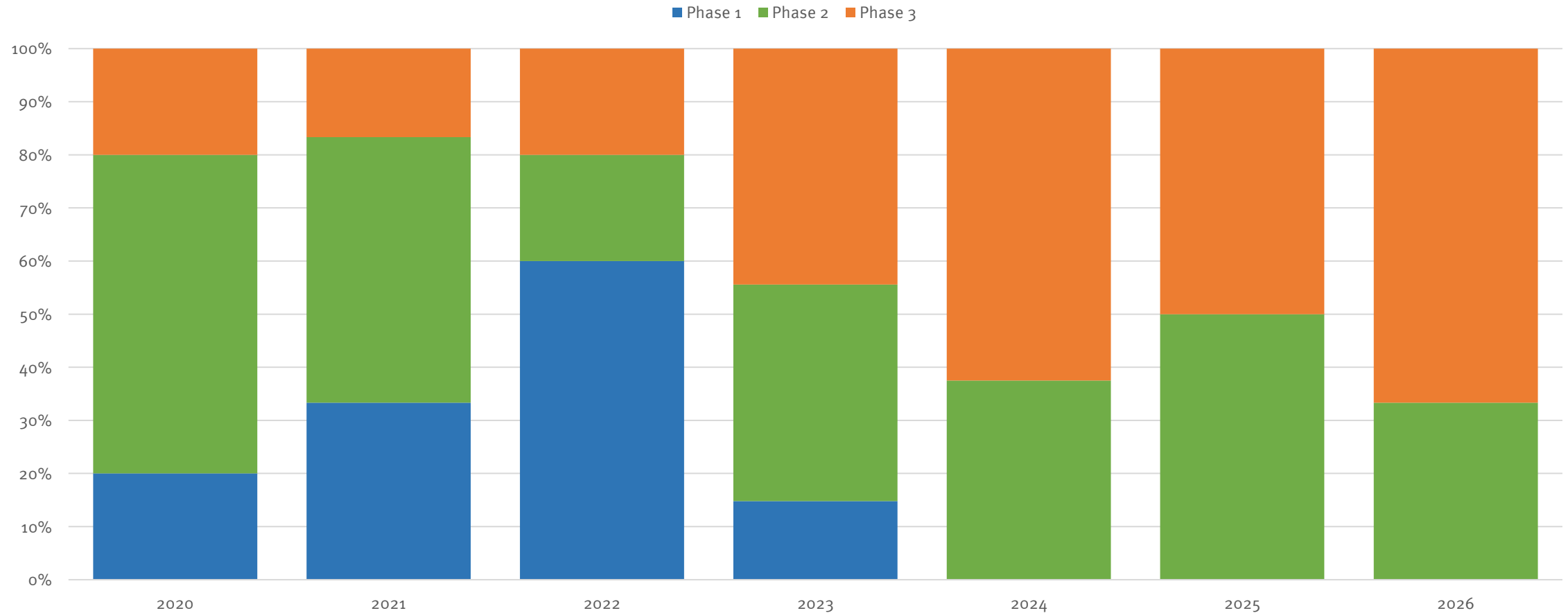


Source: S&P, CapitalIQ

# While Pre-Commercial M&A High, It is Mainly for Phase 3 Biotechs This Year

Distribution of Public Biotech by Phase of Development of Lead Molecule of Target Company, 2020 to 2026

(Public Targets Only, Value > \$75mm)



# Gilead to Acquire Tubulis Adding Potentially Best-in-Class Antibody-Drug Conjugate and Next Generation Platform to Further Strengthen Oncology Pipeline

April 7, 2026 (excerpt)

FOSTER CITY, Calif. & MUNICH--(BUSINESS WIRE)--Gilead Sciences, Inc. (Nasdaq: GILD) today announced it has entered into a definitive agreement to acquire Tubulis GmbH, a private Germany-based, clinical-stage biotechnology company developing next-generation antibody-drug conjugates (ADCs), building on Gilead's oncology pipeline, focused on addressing areas of high unmet need.

The acquisition significantly expands Gilead's ADC capabilities by adding next-generation assets and platforms designed to more selectively deliver diverse payloads to tumors and maximize patient benefit. Tubulis' lead asset, TUB-040, a NaPi2b-directed topoisomerase-I inhibitor (TOPO1i) ADC, is currently in Phase 1b/2 development for platinum-resistant ovarian cancer and non-small cell lung cancer (NSCLC). Gilead will also acquire TUB-030, a 5T4 targeted ADC, which has demonstrated promising initial clinical data across various solid tumor types. Tubulis' programs and platforms have broad potential across multiple tumor types, complementing Gilead's existing development and commercialization expertise in oncology.

Under the terms of the sale and purchase agreement, Gilead will acquire all of the outstanding equity of Tubulis for \$3.15 billion in upfront cash consideration on a cash-free, debt-free basis, subject to customary adjustments, which is payable at closing, and up to \$1.85 billion in contingent milestone payments. Closing of the transaction is subject to expiration or termination of certain regulatory filings and other customary conditions. The transaction is expected to close in the second quarter of 2026. Gilead plans to finance the transaction with a combination of cash on hand and senior unsecured notes.



# Neurocrine Will Pay \$2.9B for Soleno and its Prader-Willi Medicine

Kyle LaHucik, *Endpoints News*, April 6, 2026 (excerpt)

Neurocrine Biosciences is joining the M&A bonanza with a \$2.9 billion takeover of profitable rare disease drugmaker Soleno Therapeutics.

Neurocrine will pay \$53 per share, a 34% premium to its last closing price, the companies said Monday morning. The deal gives Neurocrine access to Soleno's Vykate XR, approved last year to quell insatiable hunger in people with the rare genetic condition Prader-Willi syndrome, which can lead to obesity and muscle impairments.

The move extends a pharma buying spree as drugmakers look to shore up their near-term pipelines and future gaps. It adds to a 10-deal, \$31.5 billion March in which a few other commercial-stage biotechs were also bought, including Apellis Pharmaceuticals and Day One Biopharmaceuticals.

"We share the Soleno team's deep commitment to the Prader-Willi syndrome community and look forward to leveraging our experience and capabilities to expand Vykate XR's reach to benefit more patients," Neurocrine CEO Kyle Gano said in a press release.

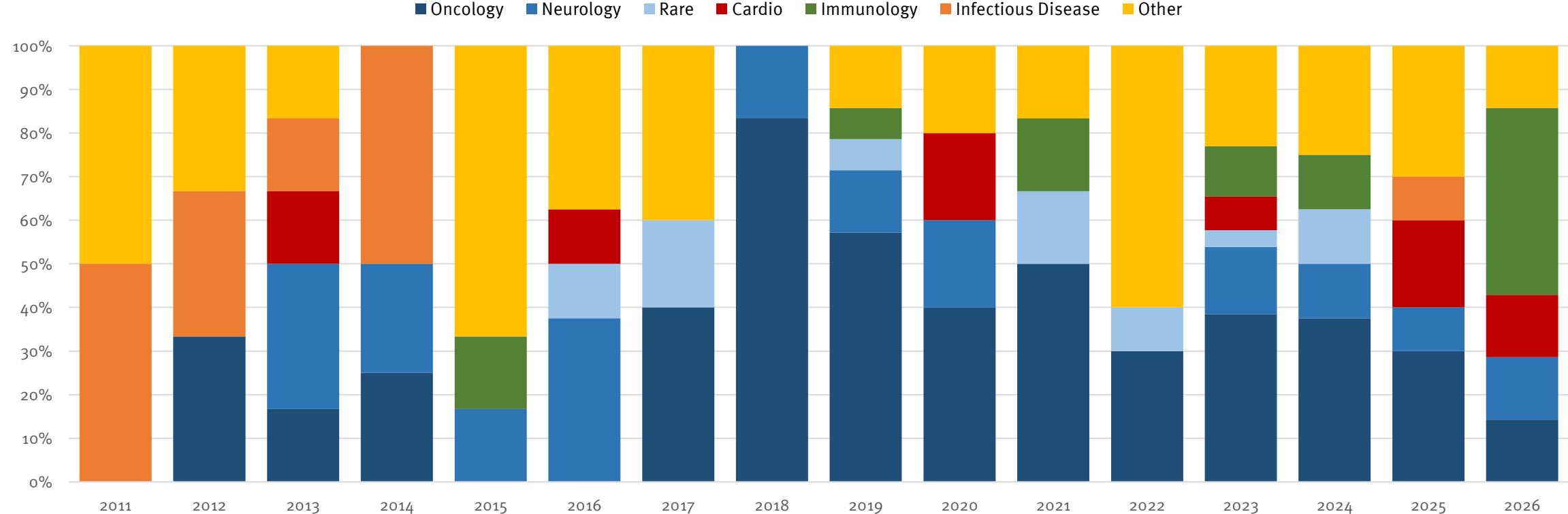


Source: <https://endpoints.news/neurocrine-pays-2-9b-for-soleno-and-its-prader-willi-medicine/>

# Public Biotech M&A This Year Has Seen High Interest in Immunology. Previous Years Were Much More Oncology Heavy

Top oncology M&A candidates in 2026 such as Revolution Medicines, Summit and Nuvation have costs that are above the price range where pharma has been shopping most (sub-\$10 billion). Not surprisingly, we are seeing less oncology takeout activity this year and much more focus on other areas where prices are more digestible such as immunology, neuro and cardiology.

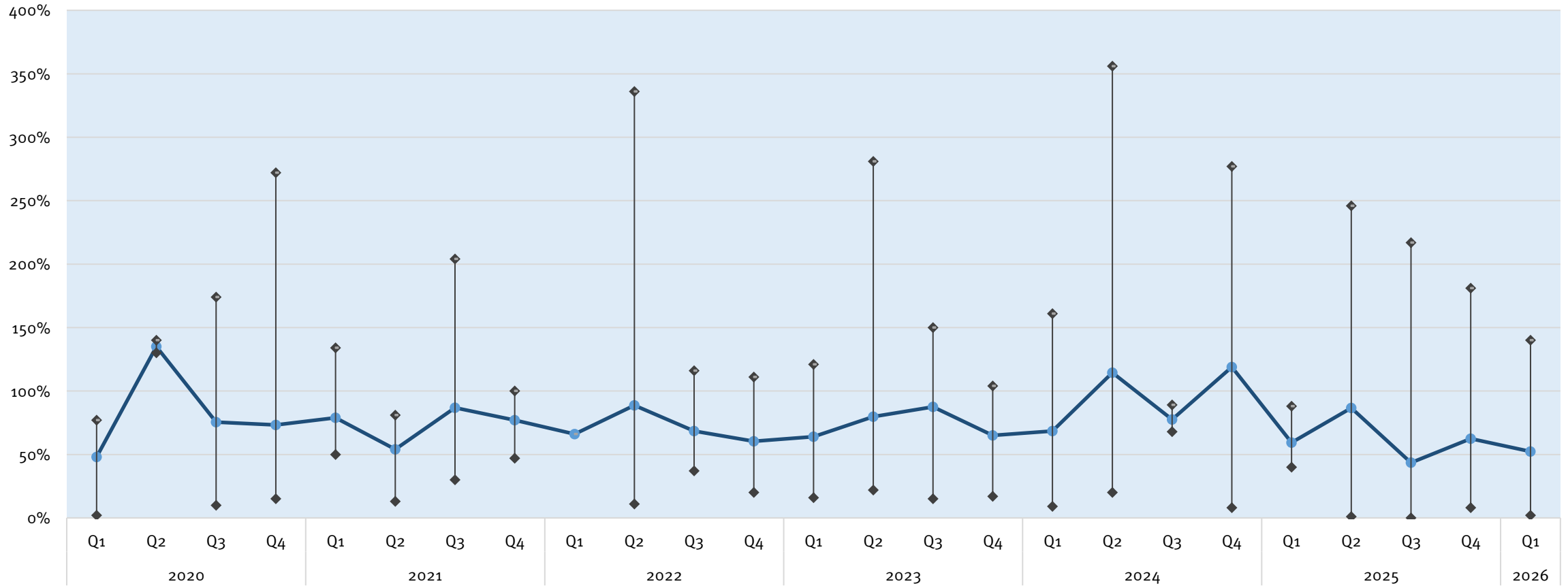
**Distribution of Public Biotech M&A by Therapeutic Area of Lead Molecule of Target Company, 2011 to 2026**  
(Public Targets Only, Value > \$75mm)



Source: S&P, CapitalIQ

# Public Biopharma M&A Premiums Have Been Coming Down (Averaging Around 50%)

Average 1-Day M&A Premiums by Quarter – Biopharma, 2020 to Q1 2026



Source: DealForma

# March M&A Surge Triggers High Expectations For 2026

**Kevin Dunleavy, *FiercePharma*, Apr 6, 2026 (excerpt)**

Forget March going out like a lamb. On the M&A landscape, March went out like a lion.

In a flurry of activity over the last 12 days of the month, biopharma companies pulled off seven transactions each for more than \$1 billion and worth a combined \$29 billion in headline value. The blitz indicates to market watchers that 2026 will be a prime year for M&A and that the surge seen in the fourth quarter of 2025 was not a false alarm.

The wild run of transactions comes on the heels of a binge in late 2025, which indicated that the M&A drought was finally coming to an end. Of the industry's nine deals worth at least \$5 billion in 2025, six came in the last four months of the year.

Mike Patrone, a Partner with DLA Piper who specializes in biopharma M&A, said in an interview with *Fierce* that the market was heating up last year before the government shutdown in October.

“The government reopened and then December was one of the busiest months I think I’ve ever had,” Patrone said. “The joke was at JPM Healthcare Conference in January was that there weren’t big announcements because they had all been pulled through and hammered out and announced in December.”

Source: <https://www.fiercepharma.com/pharma/march-ma-surge-triggers-high-expectations-2026>



## BIOTECH AND M&A ARE ROARING BACK IN 2026

# Pharma Goes on \$25.5B, Eight-Day Acquisition Spree

Kyle LaHucik, *Endpoints News*, Mar 31, 2026 (excerpt)

Pharmaceutical companies are on a dealmaking tear.

Six pharma companies have signed acquisitions worth up to \$25.5 billion since the beginning of last week. Two \$5 billion-plus upfront deals were disclosed on Tuesday morning alone: Eli Lilly's bet on Centessa Pharmaceuticals' orexins and Biogen's consummation of commercial player Apellis Pharmaceuticals. There were a total of seven deals of that magnitude in all of 2025.

It's no surprise. Large drugmakers are filling their late-stage pipelines to fend off patent cliffs, padding out earlier R&D engines to extend their dominance in certain fields, and doubling down on emerging therapeutic classes.

Across March, biopharmas lined up 10 acquisitions worth up to \$31.5 billion, according to an Endpoints News tally. Eight of those included contingent value rights or milestone payments reliant on R&D or regulatory achievements, a dealmaking structure that has become more common in recent years.

While multiple deals have happened in quick succession, the timing is likely happenstance as each deal has "its own cadence," Adam Keeney, Biogen's head of corporate development, said in an interview. Biogen has been "in touch" with Apellis for more than a year, he said.

Chen Yu, founder and managing partner of investment firm TCGX, described the deal flow as a "steady cadence" and a "little bit of a catch-up" as the biopharma industry recovers more broadly. In a Tuesday phone interview, he said every pharma has its own strategic elements, noting the lack of a broader theme among the buyouts this year.



# Big Drug Companies Hunting for Deals Are Lowering Their Sights

About three quarters of pharmaceutical deals so far this year have been between \$1 billion and \$10 billion

Peter Loftus and Javier Martinez, *Wall Street Journal*, Mar 31, 2026 (excerpt)

Big drugmakers on the deal hunt aren't opening their wallets as wide as they used to. The industry's latest acquisitions, well below \$10 billion, reflect a more tightfisted approach to dealmaking than previous periods, when big companies regularly spent tens of billions.

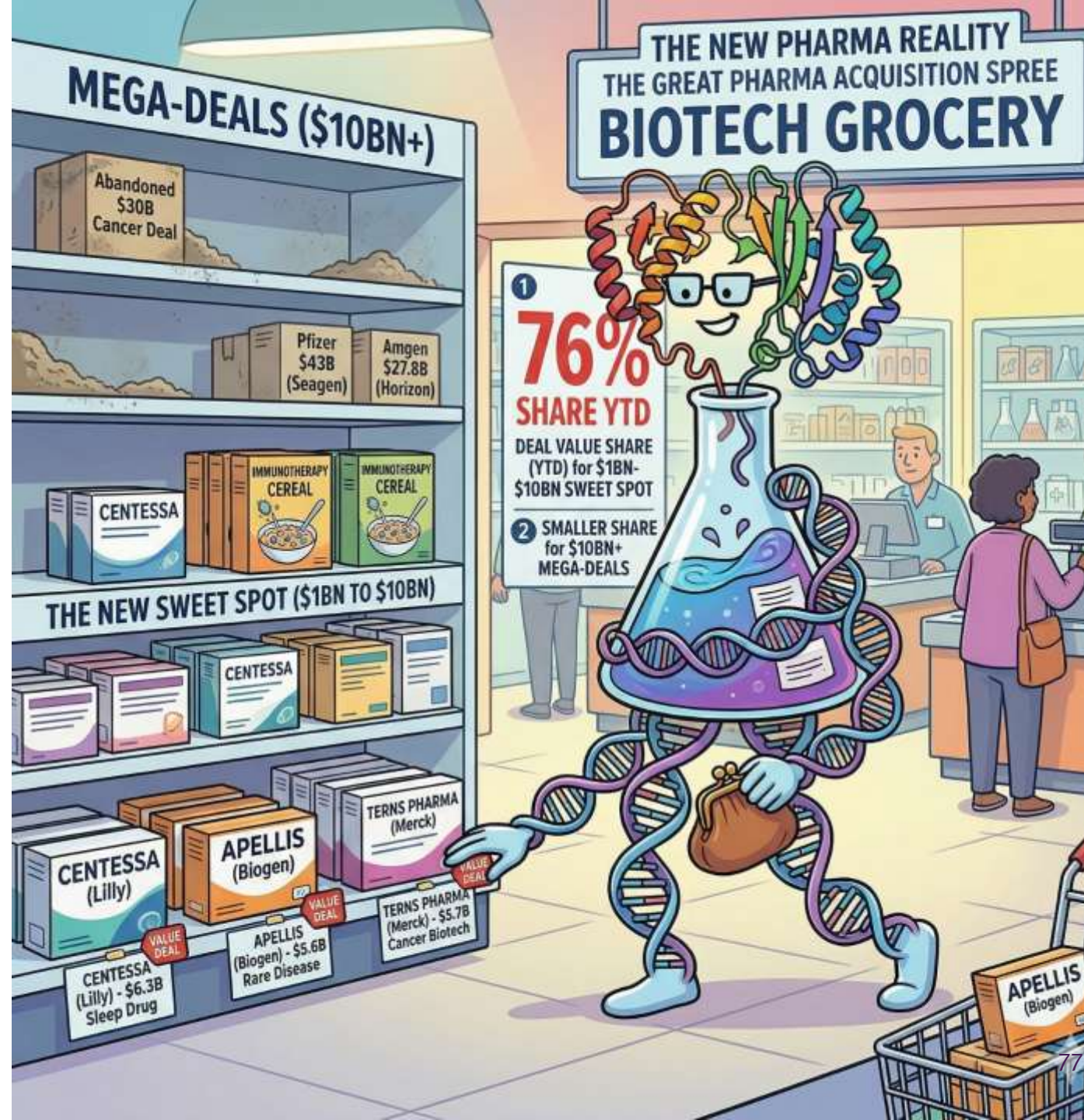
"If you do a lot of these little bolt-on deals, you can kind of craft your own portfolio that could totally complement something that you have going on internally," said Karen Anderson, director of healthcare equity research at Morningstar.

Deals between \$1 billion and \$10 billion have accounted for 76% of pharmaceutical transactions by value this year to date, up from 34% during the same period in 2025 and 42% in the first three months of 2024.

"Looking in the area up to \$15 billion is our sweet spot," Merck CEO Robert Davis said during a February earnings call.

For companies, the smaller deals are less risky than huge outlays that can saddle acquirers with big debt loads. The acquirers can also more easily tuck in a smaller acquisition, avoiding the stomach aches that come with digesting a bigger organization.

Source: <https://www.wsj.com/health/pharma/big-drug-companies-hunting-for-deals-are-lowering-their-sights-9328f710>



# Recent Bolus of Biotech M&A is “Just the Beginning”

Paul LaMonica, *Barrons*, Mar 31, 2026 (excerpt)

Big Pharma companies are constantly searching for the next hot new drugs—and it’s often a lot easier to buy them than develop them. That’s great news for biotech investors. Merger activity is starting to heat up again in the sector.

There were three notable deals in March alone. Biogen just announced a deal to buy Apellis Pharmaceuticals, a developer of immunological and rare-disease medications, for \$5.6 billion, a takeover premium of nearly 140%. Mounjaro owner Eli Lilly is buying sleep-drug maker Centessa Pharmaceuticals for \$7.8 billion. And Merck said it would buy Terns Pharmaceuticals, which is working on a drug to treat leukemia, for \$6.7 billion.

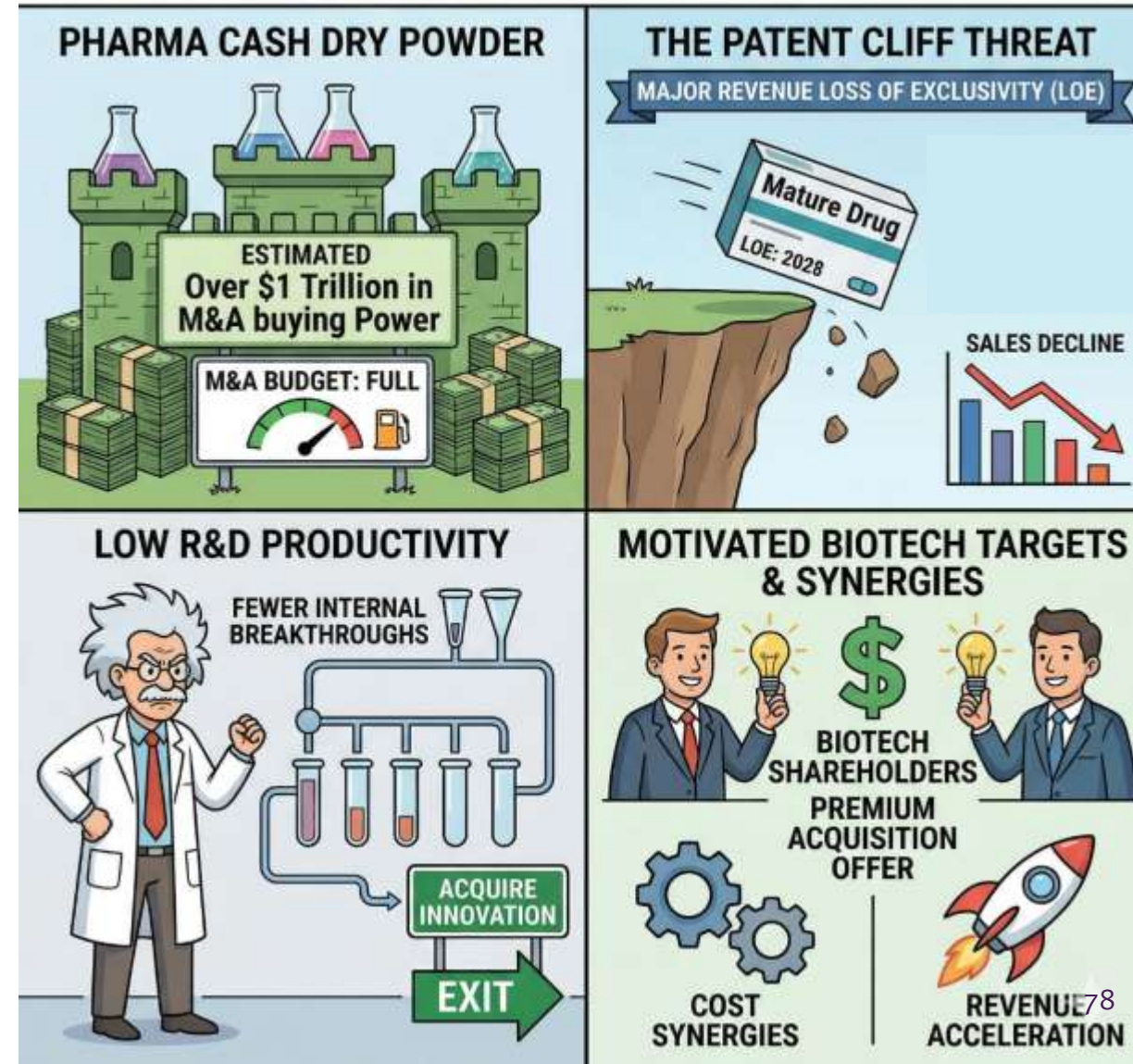
This is probably just the beginning of another wave of deals. Biopharma M&A volume nearly doubled in 2025, according to consulting firm Alvarez & Marsal, which said in a 2026 outlook report that M&A activity in biopharma is likely to remain strong this year. It is likely that both deal values and volumes will surpass 2025 levels.

Alvarez & Marsal also noted that more biotechs are deciding to sell out rather than go public.

It’s no secret why major drug companies are looking to smaller biotechs for growth. Many of the pharma giants are facing looming patent expirations for blockbuster medications in the coming years. And near-term earnings growth projections for Big Pharma firms are sluggish when compared with biotech as well. According to FactSet, pharma companies are expected to report a 30% year-over-year decline in earnings for the first quarter, compared with forecasts of 13% earnings growth for biotechs.

Source: <https://www.barrons.com/articles/biotech-stocks-etfs-38e6cb8e>

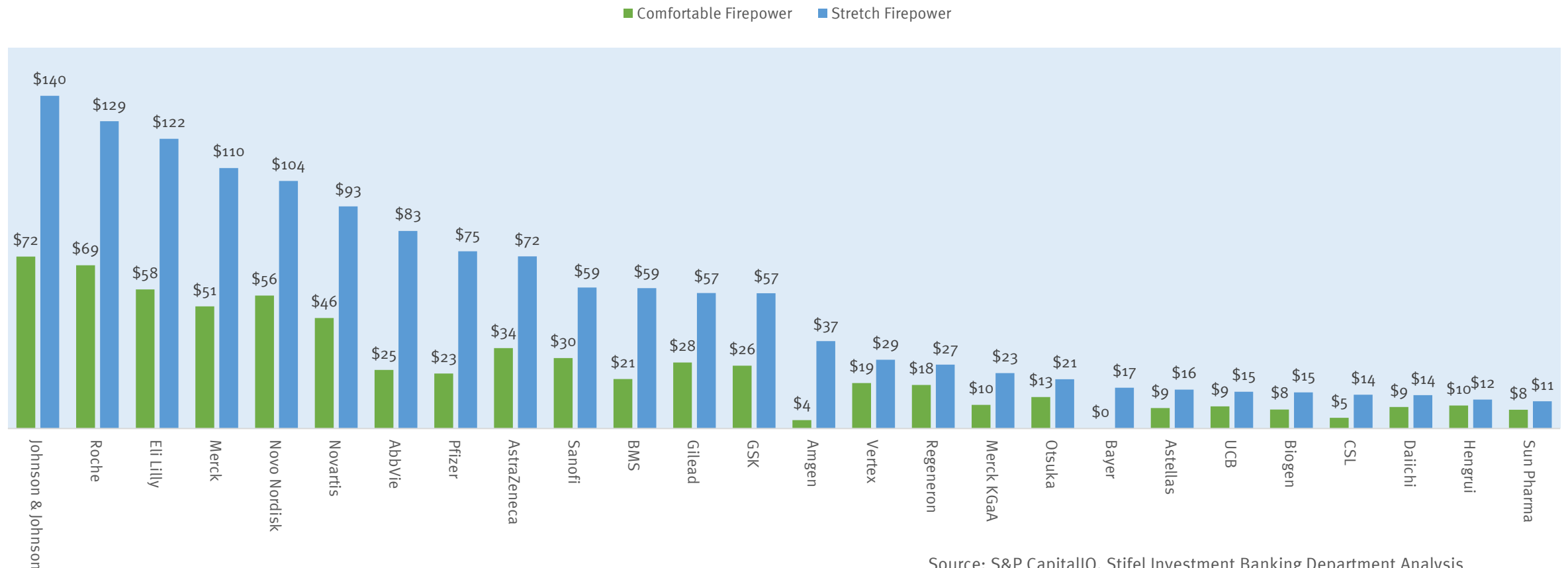
## DRIVERS OF PHARMA M&A
















# Top Pharmas Have \$1.4 Trillion of M&A Firepower

This chart shows M&A firepower of the top 26 pharmas. We define comfortable firepower as the amount of debt a company can take on given current EBITDA levels to arrive at a ratio of net debt to EBITDA of 3X. Stretched firepower would take a company to a ratio of net debt / EBITDA of 5X. Today, there is \$1.4 trillion of stretch firepower and \$650+ billion of comfortable firepower among the top 26 top pharmas. This has gone up materially from 2024. The chart on the next page describes the propensity of the top 20 pharmas to use the firepower.

M&A Firepower of Top Pharmas, April 2026 (\$ Billions)



Source: S&P CapitalIQ, Stifel Investment Banking Department Analysis

<p> EV: \$874bn</p> <p>Active in M&amp;A in core fields including oncology, neuro, immunology, gene and cardiometabolic but large M&amp;A deals not on strategy unless an exceptional opportunity arises. Interested in expanding in new areas such as female health.</p>	<p><b>Johnson&amp;Johnson</b> EV: \$615bn</p> <p>Internal focus on execution on revenue goals has brought up market cap quite a bit. Open to doing \$1obn+ deals in 2026 but under no particular pressure to do so. Consistent with add-on deals. Like oncology, neuro and immunology. Also active on device side.</p>	<p><b>abbvie</b> EV: \$433bn</p> <p>AbbVie continues to actively shape its pipeline through corporate development. Priority areas include neuroscience, immunology and oncology. They are not under pressure to do large deals and we expect that will be selective.</p>	<p> EV: \$346bn (incl. Chugai)</p> <p>Roche has not yet been active in M&amp;A in 2026. Roche has signalled ongoing interest in emerging technologies, including tech-enabled AI and diagnostics. It is open to building it business in cardiometabolic, heme/onc and immunology.</p>
<p><b>AstraZeneca</b>  EV: \$338bn</p> <p>While AZ looks at large deals its strategy is to use smaller M&amp;A and BD deals to build up its pipeline. On track to hit \$8obn in revenue by 2030 and starting to look beyond. Ongoing interest in oncology, immunology, rare disease and respiratory. Highly disciplined on value.</p>	<p> <b>MERCK</b> EV: \$335bn</p> <p>We expect Merck to continue to be one of the most active players in the market given their upcoming Keytruda LOE. This said, Merck is not desperate and sees deal-making as an offensive strategic tool. They are interested in smart deals in immune, onc &amp; cardiometabolism. OK to go over \$1obn in size.</p>	<p> <b>NOVARTIS</b> EV: \$319bn</p> <p>Novartis' 2026 M&amp;A stance is one of active strategic deal-making: continuing bolt-on acquisitions in core and adjacent areas, executing significant transactions (e.g., Avidity). Novartis face modest near-term LOE pressure and is very focused on long-term growth. Highly disciplined on getting deals done well and creating value.</p>	<p><b>AMGEN</b> EV: \$234bn</p> <p>Amgen is open at all levels in the M&amp;A market and is still consolidating Horizon. Amgen likes their internal pipeline and does not have high LOE pressure. The company is open to deals in areas of interest including primary care / obesity, immunology, oncology and rare disease.</p>
<p> <b>Boehringer Ingelheim</b> Implied EV: \$219bn (rev x ave multiple)</p> <p>Boehringer is actively looking at M&amp;A ideas but generally is not likely to do large or late-stage M&amp;A. See story on next page. BI likes to do early-stage add-on M&amp;A, particularly in areas of interest, including oncology, immunology and neurosciences.</p>	<p> <b>Pfizer</b> EV: \$189bn</p> <p>Pfizer has been active in M&amp;A in recent months and remains under LOE pressure. Has bought Metsera / Seagen and needs to deliver on these deals. New R&amp;D Head Chris Boshoff is overseeing M&amp;A and is focused on opportunities to build in oncology, immunology and general medicine.</p>	<p> <b>GILEAD</b> EV: \$186bn</p> <p>Gilead is a highly creative deal-maker and has substantial balance sheet capacity to help meet its goal to be a top five player in oncology and remain a leader in virology. Highly interested in opportunities in virology, cell (with Arcellx deal) and immunology.</p>	<p> <b>NOVO NORDISK</b> EV: \$179bn</p> <p>Novo Nordisk has a strategic need to upgrade its obesity portfolio and is open to acquisitions in rare and cardiometabolic disease after missing Metsera. We expect them to be one of the more active players in M&amp;A in 2026. Have the firepower to do something big.</p>
<p> <b>Bristol Myers Squibb</b> EV: \$158bn</p> <p>BMS continues to face substantial patent losses in the future which create ongoing pressure to do M&amp;A, particularly in areas of interest like hematology, cell, CV, solid tumors and neuro. While one should never rule out transformational deals, the strategy is to pursue add-on M&amp;A.</p>	<p><b>GSK</b> EV: \$132bn</p> <p>With Luke Miels in as new CEO, GSK wasted no time in 2026, with two rapid-fire M&amp;A deals. Expect more even add-on deals like this in 2026 with a focus on quality assets of all stages in oncology, liver disease, respiratory, and immunology. Cardiometabolism / neuro not out of the question.</p>	<p><b>sanofi</b> EV: \$130bn</p> <p>Sanofi is dependent on Dupixent which goes off patent early in the 2030's. Urgency to build late-stage pipeline. Internal pipe attractive but there is interest in bringing in projects in immunology, rare disease, vaccines, and next-gen platforms. Look for M&amp;A deals in 2026 with a new CEO.</p>	<p> <b>VERTEX</b> EV: \$101bn</p> <p>Vertex follows a unique "sandbox" strategy – which will often lead to external sourcing of assets in areas where technology facilitates medical breakthroughs. The company has been quiet about M&amp;A ambitions, but we think that more deals are possible in areas of interest.</p>
<p> <b>Takeda</b> EV: \$87bn</p> <p>New CEO Julie Kim is open to M&amp;A deals but Takeda faces some financial constraint and has ample strong internal pipeline so it is unlikely that Takeda does anything large.</p>	<p> <b>Bayer</b> EV: \$79bn</p> <p>Bayer is in the gradual process of restructuring and rebuilding its pharma pipeline. Financially constrained. We see Bayer as active on smaller deals, esp. in oncology, specialty and cell therapy (e.g., neuro). Something bigger is not out of the question.</p>	<p><b>MERCK</b> EV: \$65bn</p> <p>Merck KgAA is selectively looking for M&amp;A in areas of interest, particularly niche oncology and areas like cancer cell signalling, ADCs and cancer immunology. Late-stage / commercial is the focus area.</p>	<p><b>CSL</b> EV: \$58bn</p> <p>CSL has a strong balance sheet and has used M&amp;A to build out its kidney franchise with the acquisition of Vifor. We see CSL as potentially open to add-on deals in CV and immunology. Very smart on science and dealmaking.</p>

# ADCs, TCEs Among ‘Exciting Things’ on Boehringer’s Dealmaking Shopping List

James Waldron, *FierceBiotech*, Apr 3, 2026 (excerpt)

Boehringer Ingelheim may have been on a spending spree for licensing deals so far this year—but the German pharma has plenty more items on its shopping list.

The company kicked off 2026 penning a deal worth over \$120 million biobucks with genomics-focused Variant Bio to discover new targets for cardiorenal and kidney disease. In fact, that agreement was secured just weeks after Boehringer signed another kidney collaboration, offering Rectify Pharmaceuticals up to \$448 million to partner on a preclinical program.

It may sound like Boehringer’s blossoming pipeline has enough new additions to keep the company busy, but the drugmaker still has its eye on “a number of exciting things,” according to Paola Casarosa, Ph.D., the member of Boehringer’s board who oversees the company’s innovation unit.

“Our key focus is on T-cell engagers, as well as ADCs,” Casarosa told Fierce during a recent interview at Boehringer’s headquarters.

Neither of those deal-making priorities will come as a surprise. Boehringer recently took its DLL3/DC3 T-cell engager (TCE), called obrixtamig, into a phase 3 study for small-cell lung cancer. And when it comes to antibody-drug conjugates (ADCs), the company not only agreed a \$991 million deal to license a candidate from South Korea’s AimedBio last year, but also committed around \$31 million to a new R&D facility in Switzerland specifically focused on ADCs.



Paola Casarosa, Head of R&D, Boehringer Ingelheim

# LEK: Most Large Pharma M&A Disappoints

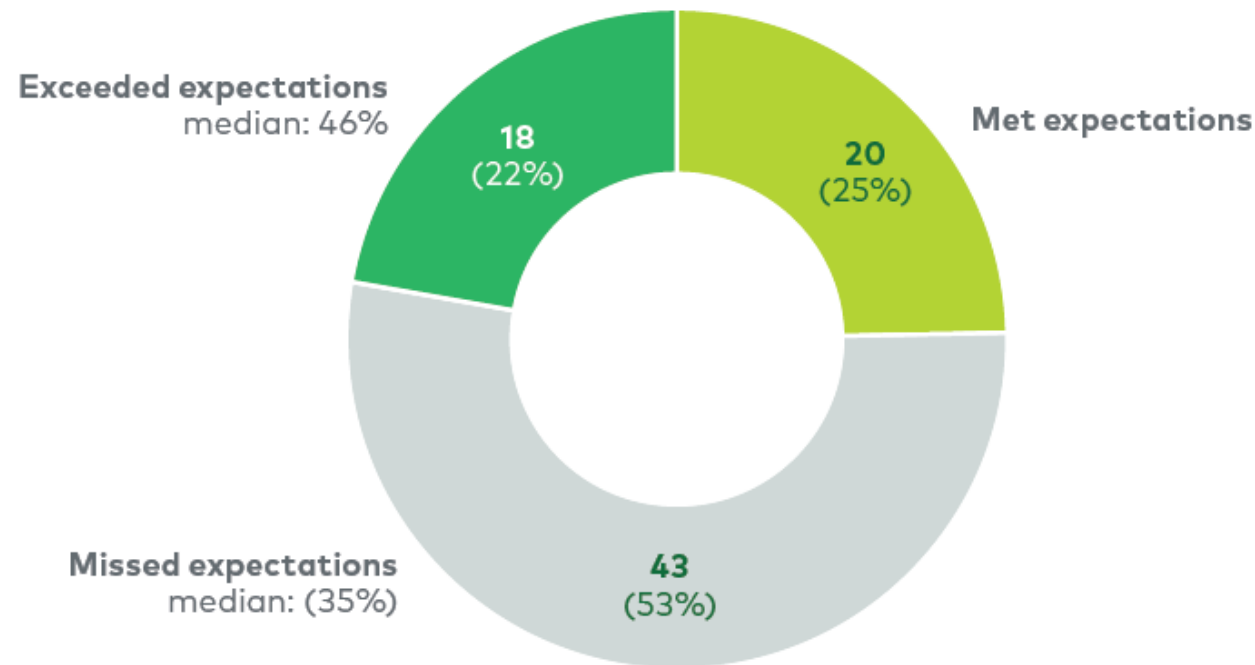
LEK, “Redefining Biopharma R&D Productivity,” Feb 2026, p. 69.

**Figure 5**

Comparison of 3-year post-launch commercial performance for lead assets acquired in public biopharma M&A (2010-2023)

## Lead asset revenue performance vs. consensus 3 years after M&A

Number of assets, (percentage of total assets) and median level of revenue performance versus sell-side consensus



Source: L.E.K. research and analysis of Cortellis, company investor materials and SEC filings, Evaluate Pharma (accessed July 2023)

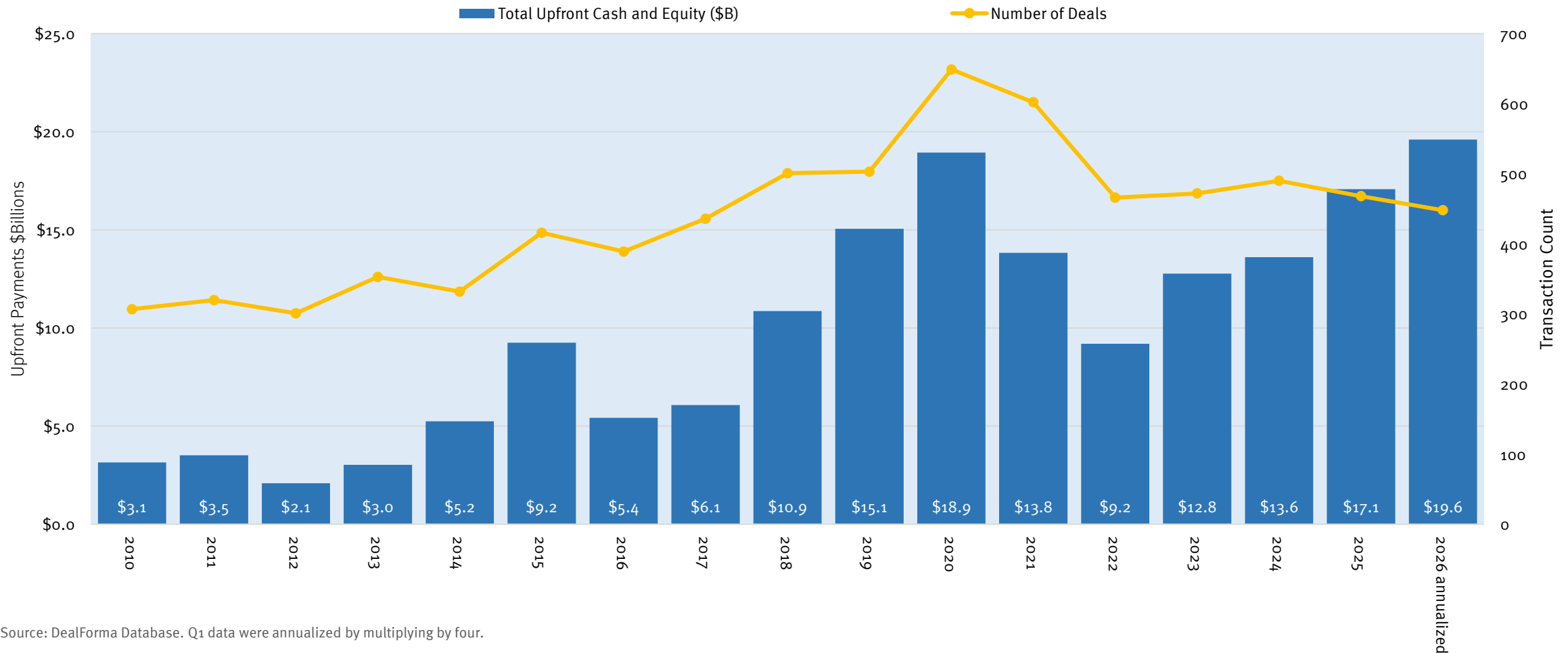
# Licensing Activity Update

Merck Research Facility, South San Francisco, CA, March 2026



# This Year Has Seen the Count of Biopharma Licensing Deals Continue to Drop While Total Upfronts Paid Are at Record Levels

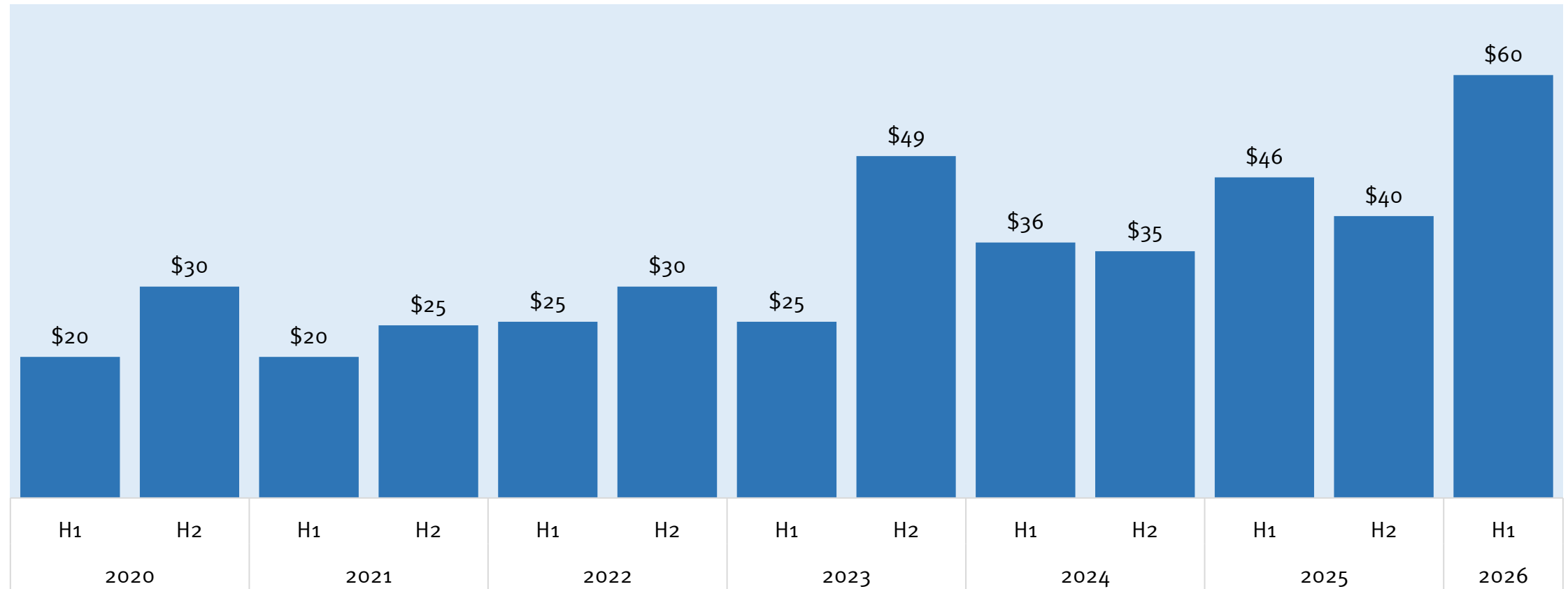
Biopharma Sector Licensing Deal Volume Statistics, 2010 to Q1 2026 (\$ Billions)



Source: DealForma Database. Q1 data were annualized by multiplying by four.

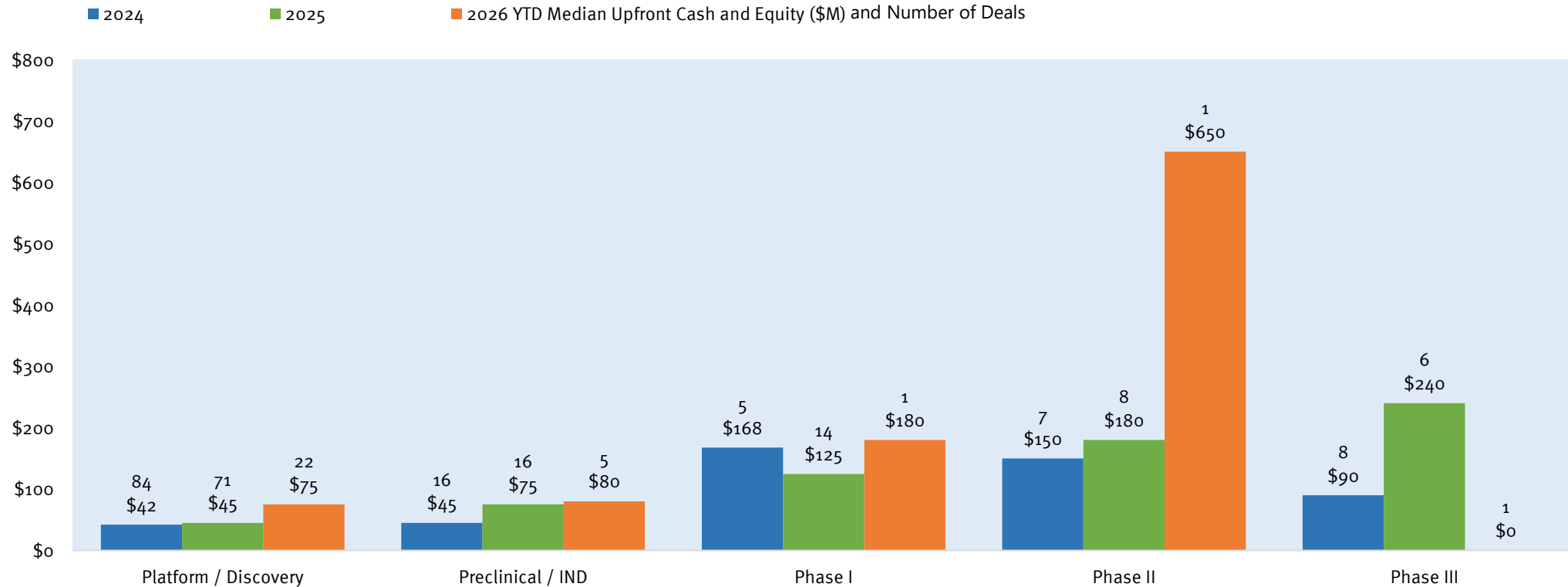
# DealForma: The Median Upfront Payment in Biopharma Sector Licensing Deals Has Been Rising Over Time

Biopharma Sector Licensing Statistics, Median Upfront Payment, 2020 to Q1 2026 (\$ Millions)



# Upfront Payments for Large Pharma In-License Deals are Highest for Later Stage Assets

Median Upfront When Big Pharma Licenses in from Smaller Biopharma (\$mm, 2024-Q1 2026)



# Milestone Packages Highest for Phase 2 Assets When Large Pharma Licenses In

Deal Terms When Big Pharma Licenses in from Smaller Biopharma (\$mm, 2024-Q1 2026)

■ Platform/Discovery ■ Preclinical/IND ■ Phase I ■ Phase II ■ Phase III Medians (\$M) and Number of Deals Disclosing



Note: Not all deals will disclose all payment terms.

# Oncology and Neuro are the Most Common Areas for Large Pharma In-License Deals

**2024-2026 YTD**

Primary Therapy Area	Deal Count	Total Deal Value (\$B)	Total Upfront Cash and Equity (\$M)	Average Upfront Cash and Equity (\$M)	Median Upfront Cash and Equity (\$M)
Cancer	378	\$182.7	\$15,780	\$122	\$44
Neurologic	134	\$66.1	\$3,727	\$76	\$28
Endocrine / Metabolic	80	\$64.0	\$5,091	\$176	\$70
Autoimmune	98	\$52.4	\$2,536	\$59	\$36
Cardiovascular	38	\$27.1	\$1,317	\$82	\$43
Pulmonary	22	\$17.8	\$877	\$146	\$92
Hematologic	14	\$13.0	\$1,097	\$122	\$95
Hepatic	17	\$12.1	\$380	\$76	\$60
Inflammation	27	\$11.0	\$599	\$60	\$43
Infectious	41	\$6.8	\$1,473	\$164	\$30
Dermatologic	16	\$4.8	\$215	\$27	\$23
Ophthalmic	30	\$4.5	\$330	\$37	\$22
Renal	15	\$3.7	\$81	\$16	\$9
Musculoskeletal	10	\$2.6	\$215	\$72	\$80
Gastrointestinal	7	\$0.6	\$1	\$0	\$0
Genitourinary	7	\$0.0	\$7	\$7	\$7
Transplant	2	\$0.0	\$0	\$0	\$0
<b>Totals</b>	<b>936</b>	<b>\$469.2</b>	<b>\$33,726</b>		

# Industry Trends and News



# Healthcare is America's Top Worry: Latest Gallup Poll

**WASHINGTON, D.C. – Mar 31, 2026:** As the Iran war intensified in March, the latest Gallup poll found healthcare topping Americans' list of domestic concerns, with more saying they worry “a great deal” about it (61%) than about 15 other domestic policy areas. This was followed by four economic matters of high concern to about half of adults: the economy, inflation, federal spending and the budget deficit, and the way income and wealth are distributed.

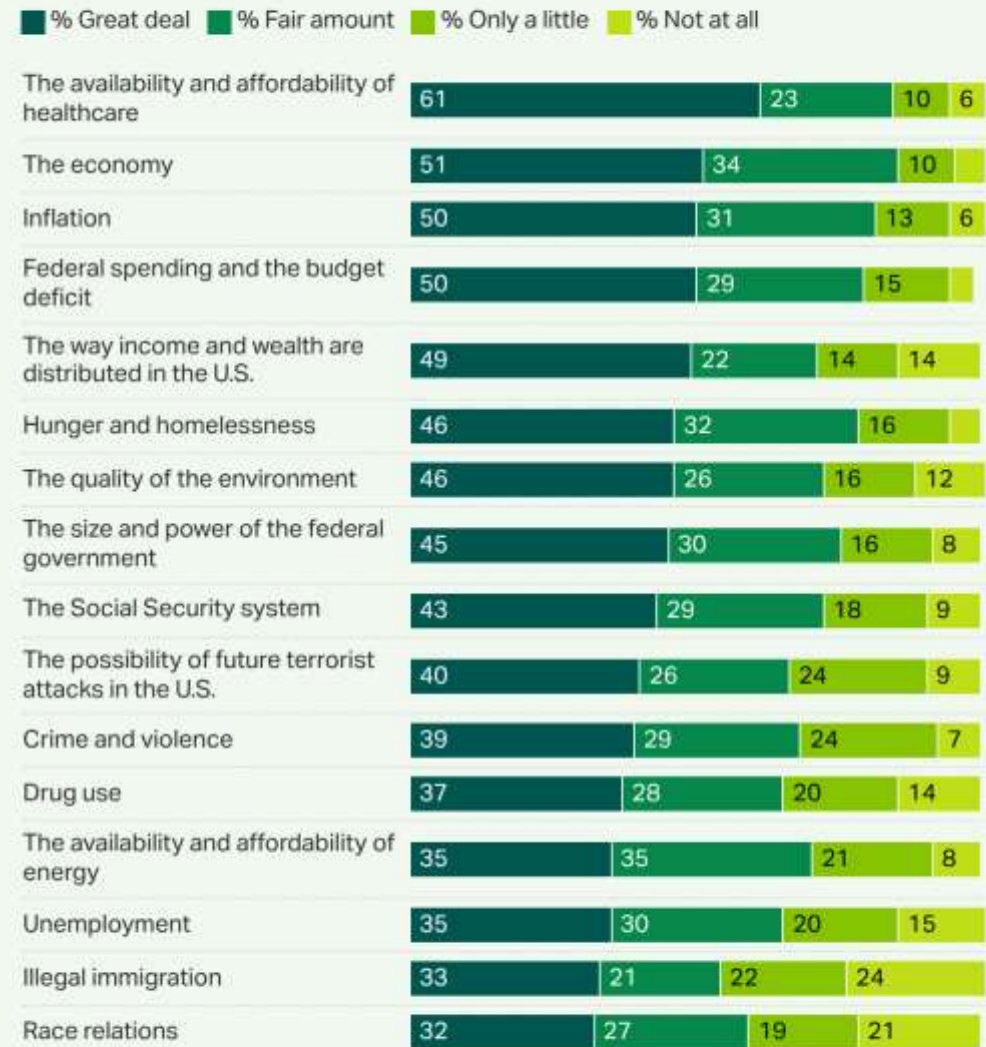
Americans were least likely to be concerned about race relations, illegal immigration, unemployment, and the availability and affordability of energy. Roughly a third said they worry a great deal about each of these.

Healthcare's current position represents a return to its prominence in prior decades. It ranked as the top concern from 2015 to 2020, before being displaced during the Biden presidency by other issues, especially the economy and inflation. Before that, from 2002 to 2014, the economy and healthcare had either tied or traded places as the leading concern. While healthcare roughly tied the economy as Americans' top concern in 2025, it now leads by a full 10 points.

Source: <https://news.gallup.com/poll/707732/healthcare-reclaims-top-spot-among-domestic-worries.aspx>

## Americans' Worries About Key Issues, 2026

Next, I'm going to read a list of problems facing the country. For each one, please tell me if you personally worry about this problem a great deal, a fair amount, only a little or not at all?



March 2-18, 2026  
Those with no opinion are not shown.

# Trump Slaps 100% Duties on Imported Drugs but Leaves Plenty of Exceptions

*Eric Sagonowsky, FiercePharma, April 2, 2026 (excerpt)*

For more than a year, the biopharma industry has had to swiftly react to various tariff threats from the Trump administration. Now, a Thursday announcement from the White House puts the U.S. tariff situation into much clearer focus.

The president has rolled out a 100% tariff rate on patented pharmaceutical products and ingredients under Section 232 of the Trade Expansion Act of 1962, according to a White House fact sheet. The duties will start in 120 days for large companies and 180 days for smaller drugmakers.

There are several ways for companies to lower the tariff rate, according to the fact sheet. For instance, under existing trade deals, products coming from the European Union, Japan, Korea, Switzerland and Liechtenstein face a 15% tariff. Under a new U.K. agreement finalized today, British drug exports to the U.S. are exempt from tariffs.



# Pharma Industry Statement on Trump Tariff Announcement

**WASHINGTON, D.C. (April 2, 2026)** — The Pharmaceutical Research and Manufacturers of America (PhRMA) President and CEO Stephen J. Uhl released the below statement regarding the announcement of Section 232 tariffs:

“Tariffs on cutting-edge medicines will increase costs and could jeopardize billions in U.S. investments announced in the last year. Every dollar spent on tariffs is a dollar that can’t be invested in communities across the country.

“The innovative biopharmaceutical sector has a robust U.S. manufacturing footprint. In fact, two-thirds of the medicines that are consumed in the U.S. are made in America. And when innovative medicines or their inputs are sourced from other countries, these products overwhelmingly come from reliable U.S. allies, like Europe and Japan.

“For decades, the United States has led the world in biopharmaceutical innovation, delivering \$1.7 trillion in economic impact, supporting 5 million American jobs and providing patients with the best access to new medicines anywhere in the world. At a time when America’s global leadership in biopharmaceutical innovation is being challenged—and Americans are struggling to afford their insurance premiums—we need smart policies to ensure that the U.S. remains the best place in the world to discover and manufacture affordable, lifesaving medicines. Tariffs will undermine this important goal.”

# Eli Lilly Opposes Push to Pass Trump’s Drug Pricing Deals Into Law, CEO Says

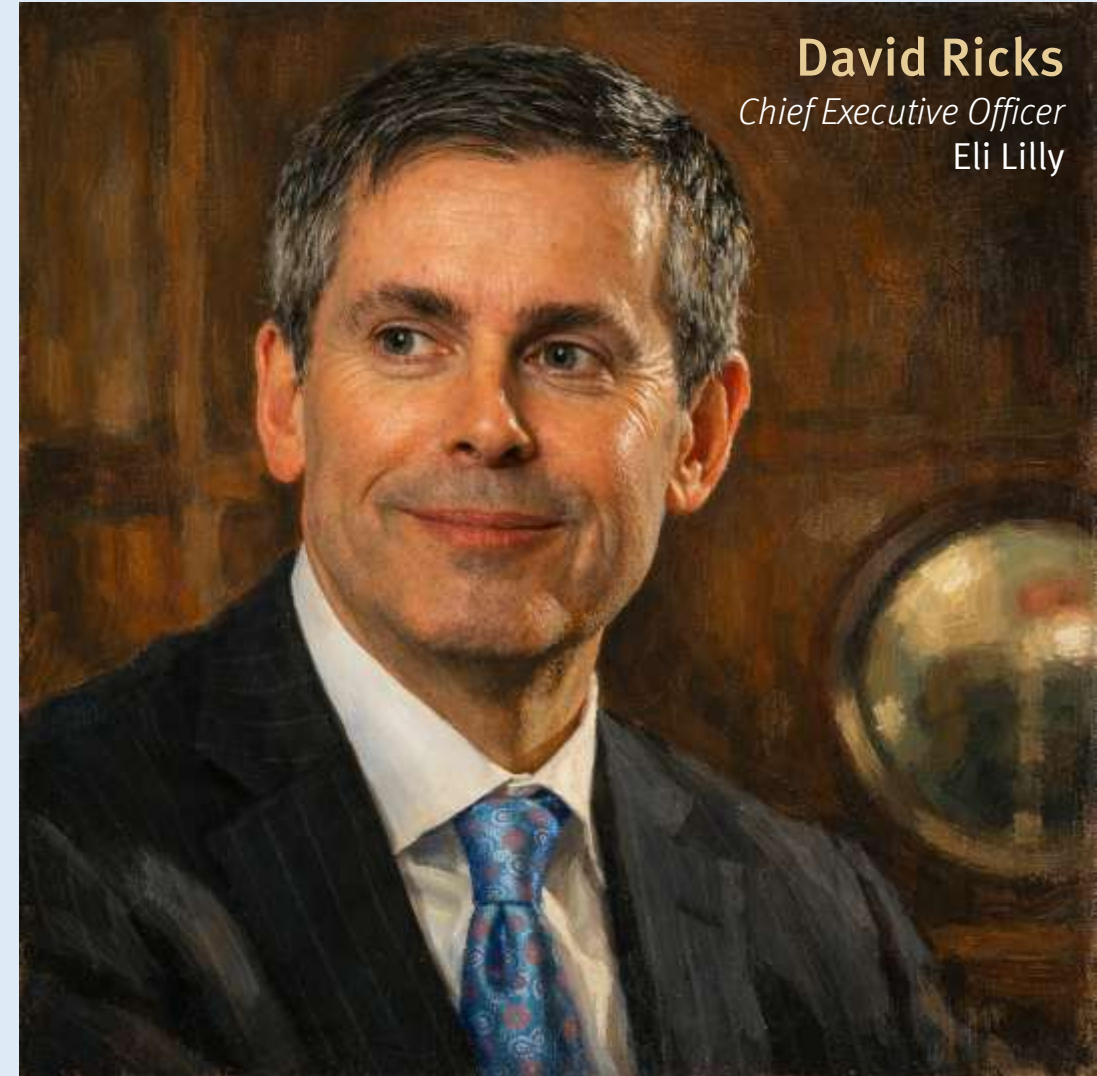
Angelica Peebles, *CNBC*, April 1, 2026 (excerpt)

Eli Lilly opposes the White House’s push to codify “most favored nation” drug pricing into law, CEO Dave Ricks said in an interview with CNBC.

Lilly doesn’t support it, Ricks said.

“When you throw it into the congressional process, what goes in is not what’s going to come out,” Ricks said. “And I think we see a lot of people who would rather reduce prices today and not worry about whether we have any new medicines tomorrow, not worry about whether America will have a robust drug industry and we’ll be able to do research in this country. And I worry about those things, so I don’t think that’s a great idea, and we’ve been pretty clear with the administration and the congressional leaders about that.”

Ricks said he thinks the Trump administration and leadership on the Hill are listening to the company’s concerns, but he said Lilly will use “all the tools we have to combat bad policy, and we think it would be bad policy.”



**David Ricks**  
Chief Executive Officer  
Eli Lilly

# Slasher Sequel: Trump Again Proposes Major Cuts to U.S. Science Spending

*Science*, April 3, 2026 (excerpt)

If at first you don't succeed, try, try again. That appears to be the thinking behind the 2027 budget request to Congress that President Donald Trump unveiled today. For the second straight year, the White House is asking Congress to make deep cuts to federal research spending, including a 55% cut to the National Science Foundation (NSF), a 23% cut to NASA, a 15% cut to the Department of Energy's (DOE's) Office of Science, and a 12% cut to the National Institutes of Health (NIH). The plan also calls for eliminating a host of programs that focus on climate change and the environment, and limiting agency spending on publishing scientific papers and subscribing to journals.

Earlier this year, lawmakers largely rejected similarly steep cuts to science that Trump requested for 2026. But it will be months before it becomes clear whether Congress will resist the new requests for cuts, which would take effect when the 2027 fiscal year begins on 1 October.

Research funding advocates are hoping Congress balks again. "We urge Congress, as they did with the [2026] budget, to reject these short-sighted cuts and increase investments in America's scientific enterprise," the Association of American Universities, which represents top research institutions, said in a statement.

Source: <https://www.science.org/content/article/slasher-sequel-trump-again-proposes-major-cuts-u-s-science-spending>



# Pharma Just “Scratching the Surface” of Weight-Loss Drug Market

Aanu Adouye, *Financial Times*, April 5, 2026 (excerpt)

Pharma companies are just “scratching the surface” of the huge potential market for weight-loss drugs and should focus more on widening access, according to the boss of the company behind Wegovy and Ozempic.

Mike Doustdar, chief executive of Novo Nordisk, told the FT in an interview, “You need to expand the market especially if you work in a business like ours. In the US, there are 110mn people [with] obesity.”

He added that Novo, its main rival Eli Lilly, and US “compounding” pharmacies that make copycat obesity drugs combined “are scratching the surface — we’re getting no more than 10 to 15 per cent of that population at this point in time. There’s very little talk about the rest.”

It is hoping that the launch of its weight-loss drug Wegovy in pill form this year will help it win back ground, though Lilly has also just won US regulatory approval for its weight-loss pill Foundayo.

Doustdar said the need to expand access was one reason Novo agreed to cut prices for drugs sold via TrumpRx, the US president’s prescription website. Lilly and a number of other big pharma companies reached similar deals.

Source: <https://www.ft.com/content/919390a5-a9ec-4f18-b764-df308ec51819?syn-25a6b1a6>

## NOVO NORDISK: CEO, HQ, & WEIGHT LOSS MISSION





# Beam's Risto-Cell and Editas' HBG1/HBG2 Therapeutic Featured Last Week in NEJM

Franco Locatelli, Editorial, *New England Journal of Medicine*, April 1, 2026

Now in the Journal, three studies, each evaluating a single treatment, show new gene-editing approaches, and the results document a similar therapeutic benefit for patients with transfusion-dependent  $\beta$ -thalassemia or sickle cell disease. Frangoul et al. and Hanna et al. evaluated the safety and efficacy of renizgamglogene autogedtemcel (reni-cel), in which a different Cas nuclease (namely, Cas12a) is used in order to disrupt the binding sites of BCL11A in the promoters of the two  $\gamma$ -chain genes to treat transfusion-dependent  $\beta$ -thalassemia and sickle cell disease, respectively. In a third study, Gupta et al. evaluated the safety and efficacy of ristoglogene autogetemcel (risto-cel), which involves base editing to introduce A-to-G substitutions in these same promoters (apparently without the creation of double-stranded breaks in DNA). Treatment success in terms of freedom from blood transfusions and vaso-occlusive events was high and similar to that observed in the pivotal studies of exa-cel. The percentage of edited alleles in both bone marrow and peripheral-blood cells appeared to be stable over time. Gupta et al. found relatively quick time-to-neutrophil and time-to-platelet engraftment, an observation that might be expected to reduce treatment burden on patients and health care facilities. Moreover, the mean endogenous level of fetal hemoglobin (as a percentage of total hemoglobin level) by month 4 was greater than 60%, a value higher than that observed in other studies. Overall, the studies by Frangoul et al., Hanna et al., and Gupta et al. corroborate the role of gene editing as a potentially curative treatment for hemoglobinopathies.

Source: <https://www.nejm.org/doi/full/10.1056/NEJMe2602194>

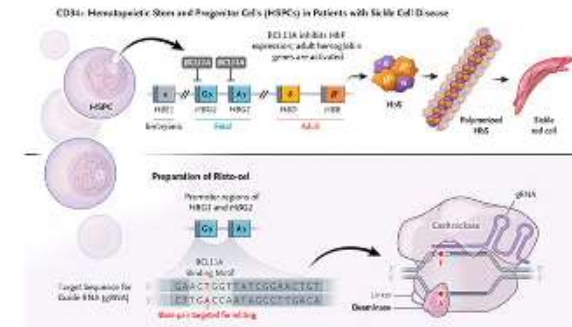
ORIGINAL ARTICLE

## Risto-cel for Sickle Cell Disease

A.O. Gupta and Others

In this study involving persons with sickle cell disease, adenine base editing was used to target the promoters of HBG1 and HBG2 in autologous hematopoietic stem cells to increase fetal hemoglobin expression.

Editorial More Options for Gene Editing in Hemoglobinopathies



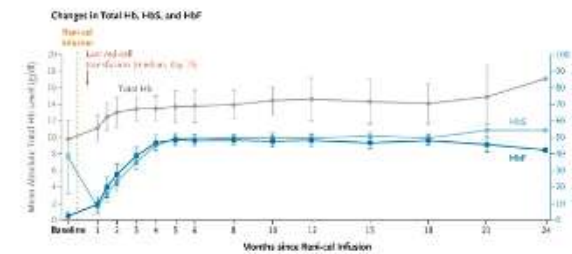
ORIGINAL ARTICLE

## Editing the HBG1 and HBG2 Promoters for Sickle Cell Disease

R. Hanna and Others

In this study, a Cas12a–guide RNA complex was used to target the promoters of HBG1 and HBG2 in autologous stem cells to treat sickle cell disease.

Editorial More Options for Gene Editing in Hemoglobinopathies



ORIGINAL ARTICLE

## Editing HBG1 and HBG2 Promoters for $\beta$ -Thalassemia

H. Frangoul and Others

In this study, a Cas12a–guide RNA complex was used to target the promoters of HBG1 and HBG2 in autologous stem cells to treat transfusion-dependent  $\beta$ -thalassemia.



# Lancet Paper Shows that Foundayo Delivers Better Efficacy than Oral Wegovy in T2DM

Rosenstock et.al, Lancet, Mar 21, 2026

The primary objective of non-inferiority was met and both orforglipron doses showed superiority to both semaglutide doses, including orforglipron 12 mg versus semaglutide 14 mg. The most frequent adverse events were gastrointestinal events (orforglipron: 249 [59%] of 424 on 12 mg and 245 [58%] of 423 on 36 mg; semaglutide: 157 [37%] of 426 on 7 mg and 193 [45%] of 425 on 14 mg), most of which were mild to moderate in severity. More participants in the orforglipron groups (37 [9%] on 12 mg and 41 [10%] on 36 mg) discontinued study treatment due to adverse events than in the semaglutide groups (19 (4%) on 7 mg and 21 (5%) on 14 mg), and mean increase in pulse rate was greater in the orforglipron groups (12 mg 3.7 bpm; 36 mg 4.7 bpm) than in the semaglutide groups (7 mg 1.0 bpm; 14 mg 1.5 bpm).

Source: [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(26\)00202-3/](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(26)00202-3/)

## Graphical Abstract

Efficacy and safety of once-daily oral orforglipron compared with oral semaglutide in adults with type 2 diabetes (ACHIEVE-3): a multinational, multicentre, non-inferiority, open-label, randomised, phase 3 trial

Rosenstock J, Yabe D, Li J, et al.



### 1 The study

**Participants:** Adults with type 2 diabetes inadequately controlled with metformin, HbA<sub>1c</sub> between 7.0% and 10.5%, and BMI at least 25 kg/m<sup>2</sup>.

**Intervention:** Orforglipron (12 mg or 36 mg) administered orally once per day.

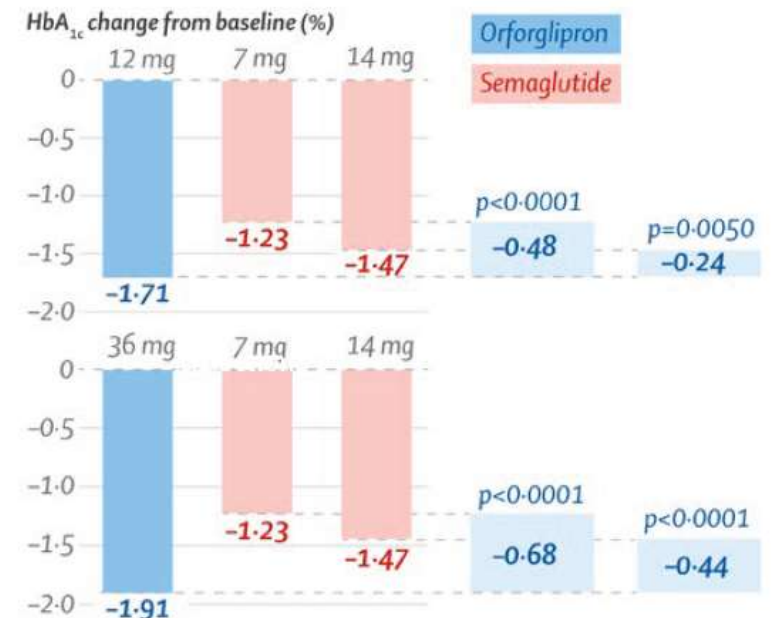
**Comparator:** Semaglutide (7 mg or 14 mg) administered orally once per day.

**Primary outcome:** Mean change at week 52 from baseline in HbA<sub>1c</sub>.

**Key limitation:** The open-label design could have introduced bias in subjective assessments.

### 2 Findings

Orforglipron was non-inferior and superior to semaglutide with respect to the mean change in the HbA<sub>1c</sub> from baseline to 52 weeks.



# Eric Topol Interviews Adrian Woolfson, an Advocate of Genome Writing for Betterment of Humanity

Eric Topol, Substack, March 29, 2026 (excerpt)

Adrian is a molecular biologist and co-founder and CEO of Genyro, a synthetic biology company. He has published 2 previous books on life science (*Life Without Genes* and *An Intelligent Person's Guide to Genetics*). In this conversation we discussed his new book, cover below and the title of this post.

As Adrian puts it, a monumental shift, a second genesis, the “artivolution,” ability to use a molecular Gutenberg press, it’s post-Darwinian.

We talked about the jump from DNA reading to editing and now writing genomes, with the potential of the latter for both good and harm. I disagreed with Adrian about the bright prospects for curing diseases, but there are many possibilities for positive impact, such as intervening vs the climate crisis and sustainability.

**“It should be possible to meet most of humanity’s needs through biologically inspired designs—to solve many global problems, revolutionize health care, extend human lifespan, and create other organisms to order.”—Adrian Woolfson**

Source: <https://erictopol.substack.com/p/on-the-future-of-species>

'A visionary and exhilarating exploration of biology's next great frontier'  
Tim Coulson

## On the *Future* of Species



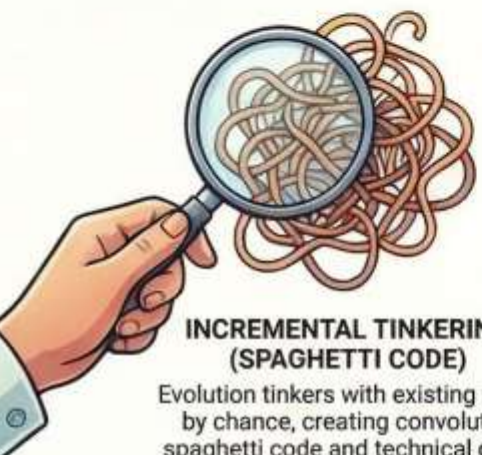
**AUTHORING LIFE** BY MEANS OF  
**ARTIFICIAL BIOLOGICAL  
INTELLIGENCE**

ADRIAN WOOLFSON

BLOOMSBURY

# Authoring Life: The Transition from Darwinian Evolution to ABI

## NATURAL SELECTION: The Blind Mechanic



### INCREMENTAL TINKERING (SPAGHETTI CODE)

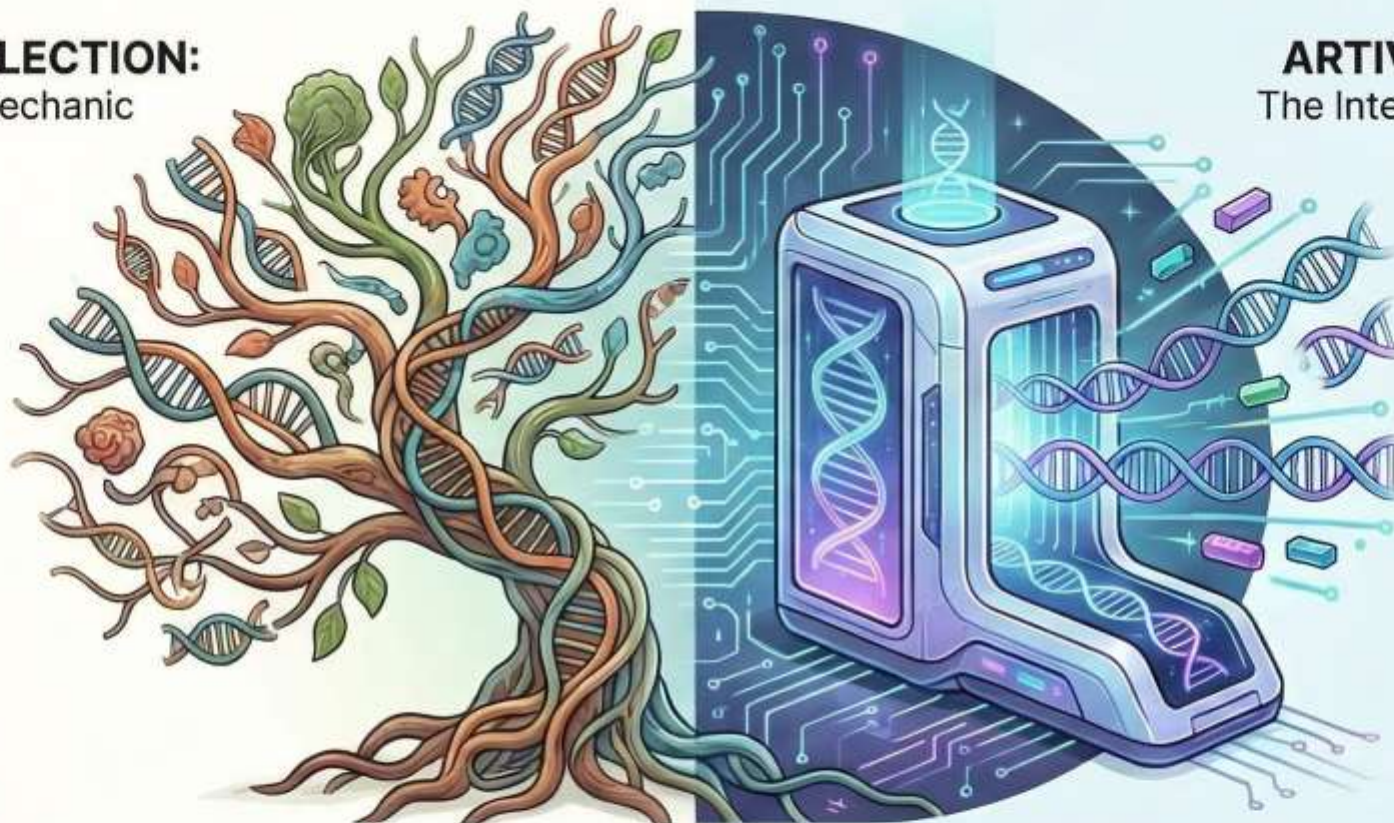
Evolution tinkers with existing parts by chance, creating convoluted spaghetti code and technical debt.



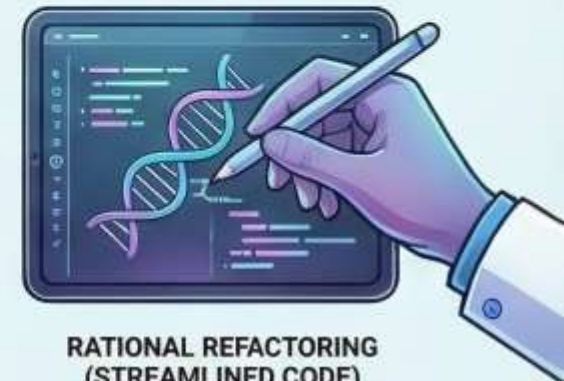
Random mutation



Survival of the Fittest



## ARTIVOLUTION: The Intentional Design



### RATIONAL REFACTORING (STREAMLINED CODE)

Intentional, human-inspired design of novel species to solve global health and environmental challenges.



GOAL:



Predicted Social & Medical Utility

## FROM "READING" TO "AUTHORING"











READING

We are moving beyond sequencing (reading) to writing entirely new DNA scripts from scratch.



AUTHORING

Feature	Darwinian Evolution	Artificial Biological Intelligence (ABI)
Driver	Random Mutation & Natural Selection 	Intentional AI Design & Synthesis 
Process	Incremental Tinkering (Spaghetti Code) 	Rational Refactoring (Streamlined Code) 
Goal	Survival of the Fittest  	Predicted Social & Medical Utility  

## THE TOOLKIT OF THE NEW ERA



### MAPPING "FRED'S LIBRARY"

AI allows us to navigate the infinite mathematical space of all possible DNA sequences.



### THE CHEMICAL PRINTING PRESS

Synthetic genomics converts digital codes into physical, functioning biological entities.



### REFACTORING THE HUMAN GENOME

Rewriting code can eliminate polygenic diseases that simple gene editing cannot fix.

# IQVIA Institute 2026 R&D Trends Report

TCG Labs Soleil / Myriad Site, South San Francisco, CA, March 2026

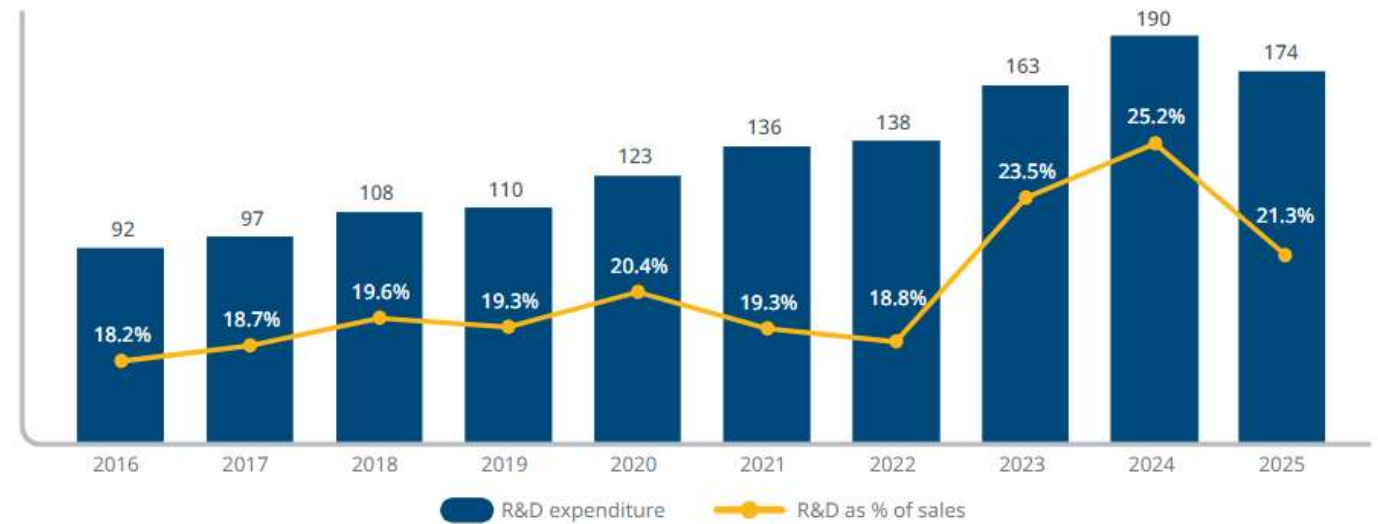


# IQVIA Institute R&D Trends Report Released in Late March



## Total R&D Spend Dropped in 2025 for the First Time in Many Years

Exhibit 8: Large pharma R&D expenditure (including IPRD) and as a percentage of sales 2016–2025, US\$Bn



Source: Company financial statements; IQVIA Institute, Feb 2026.

# Pre-Commercial Biotech Responsible for Most Trial Starts – a Major Shift

A decade ago saw large pharma be the #1 type of sponsor of clinical trials. This has now turned with biotech in the lead in clinical trial activity. Pharma's are increasingly outsourcing their R&D activity to biotech.

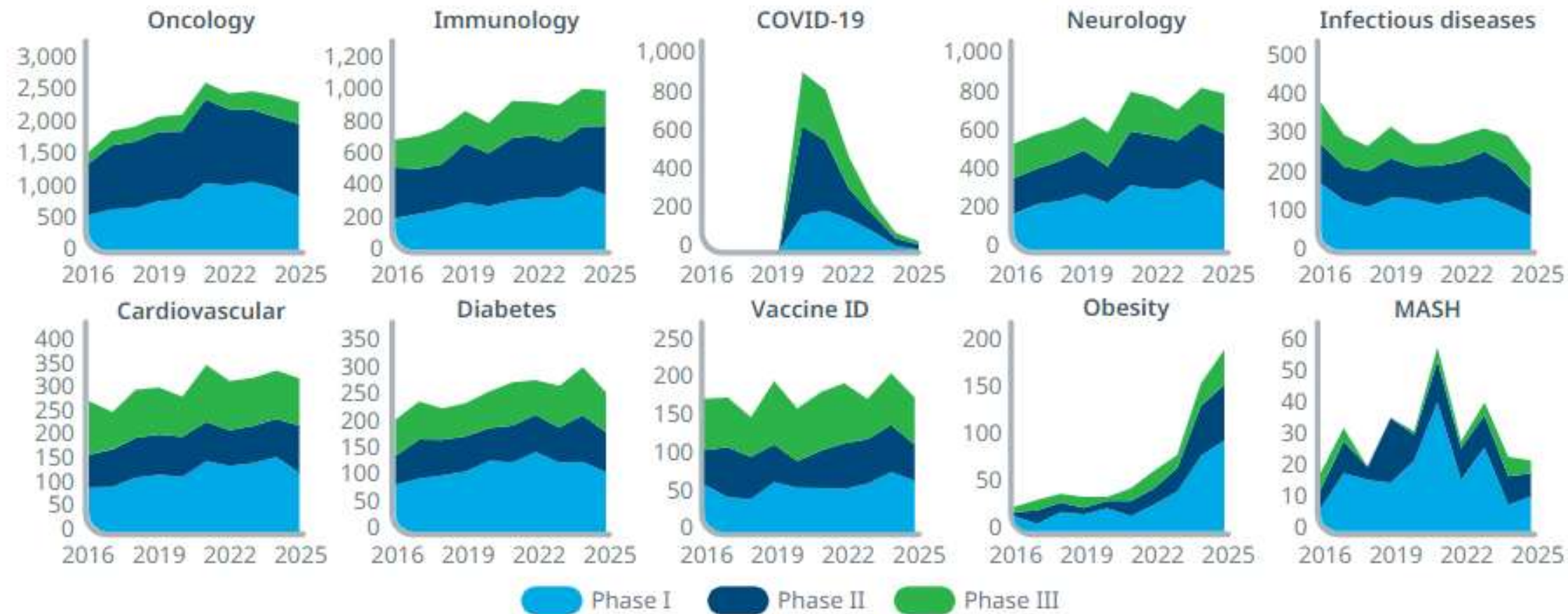
Exhibit 12: Clinical trial starts by phase and company segment, 2016-2025



Source: Citeline Trialtruve, Jan 2026; IQVIA Institute, Feb 2026.

# Obesity trial starts have increased rapidly since 2020, while immunology and neurology trials have been steadily growing

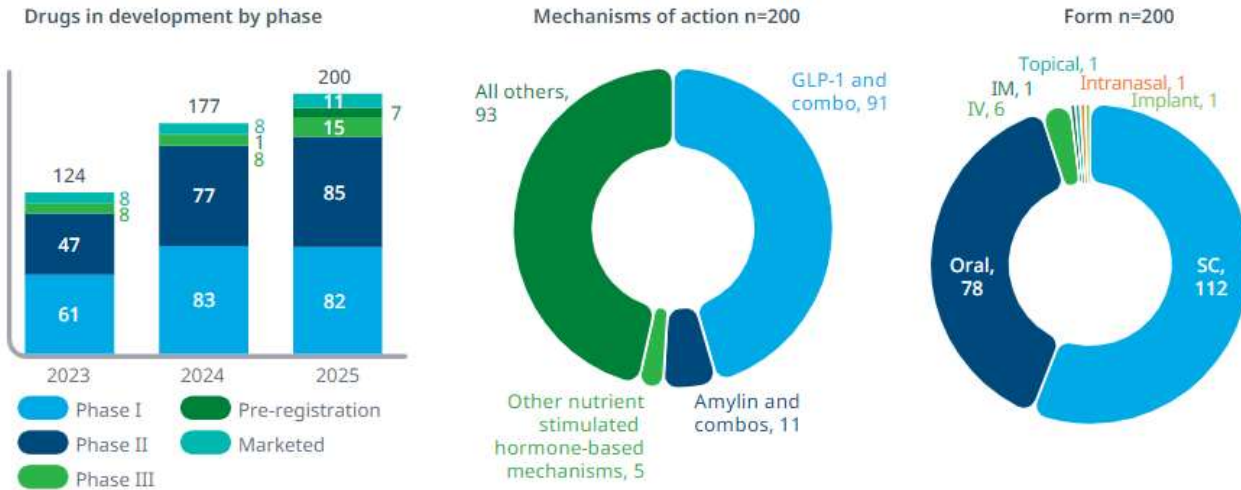
Exhibit 18: Clinical trial starts by year and phase, 2016-2025



Source: Citeline Trialstrove, Jan 2026; IQVIA Institute, Feb 2026.

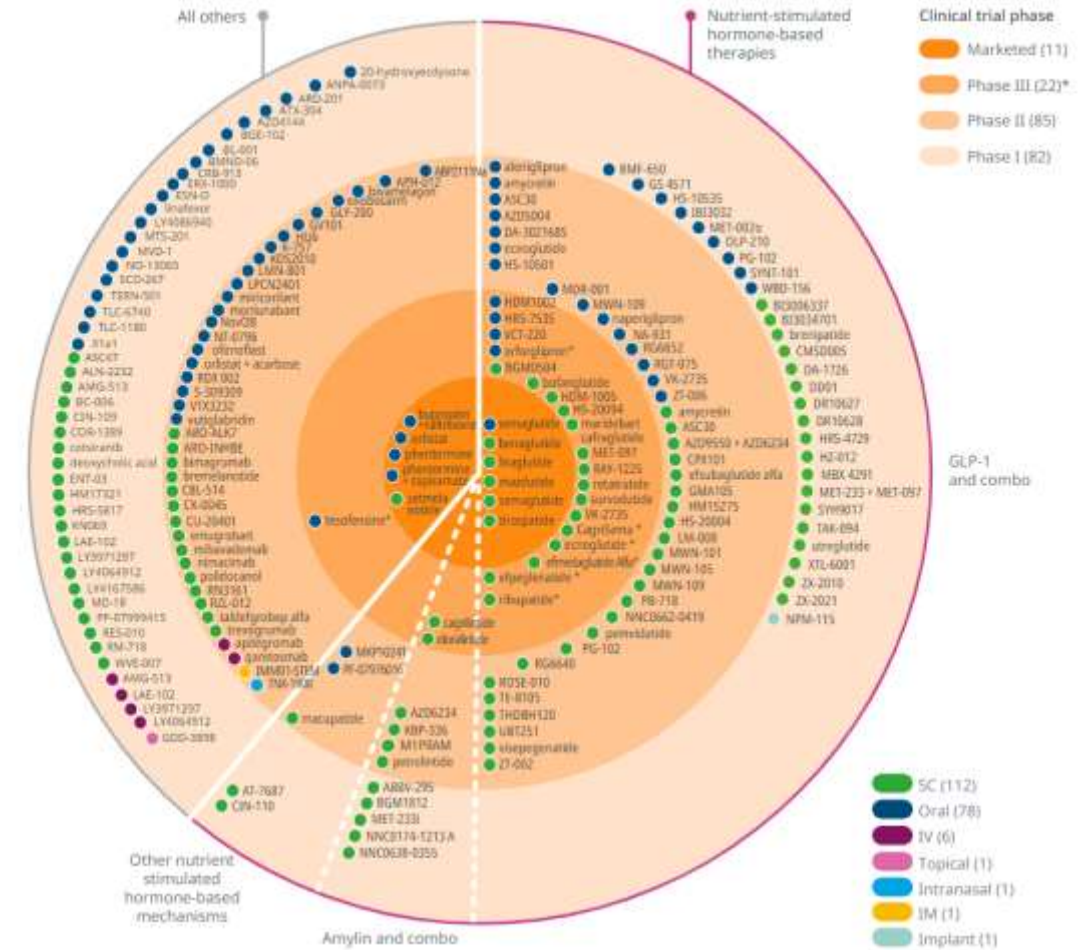
# There are 200 obesity medicines in development or marketed with multiple targets and forms beyond the leading GLP-1 therapies

Exhibit 24: Obesity pipeline by phase, mechanism of action and route of administration



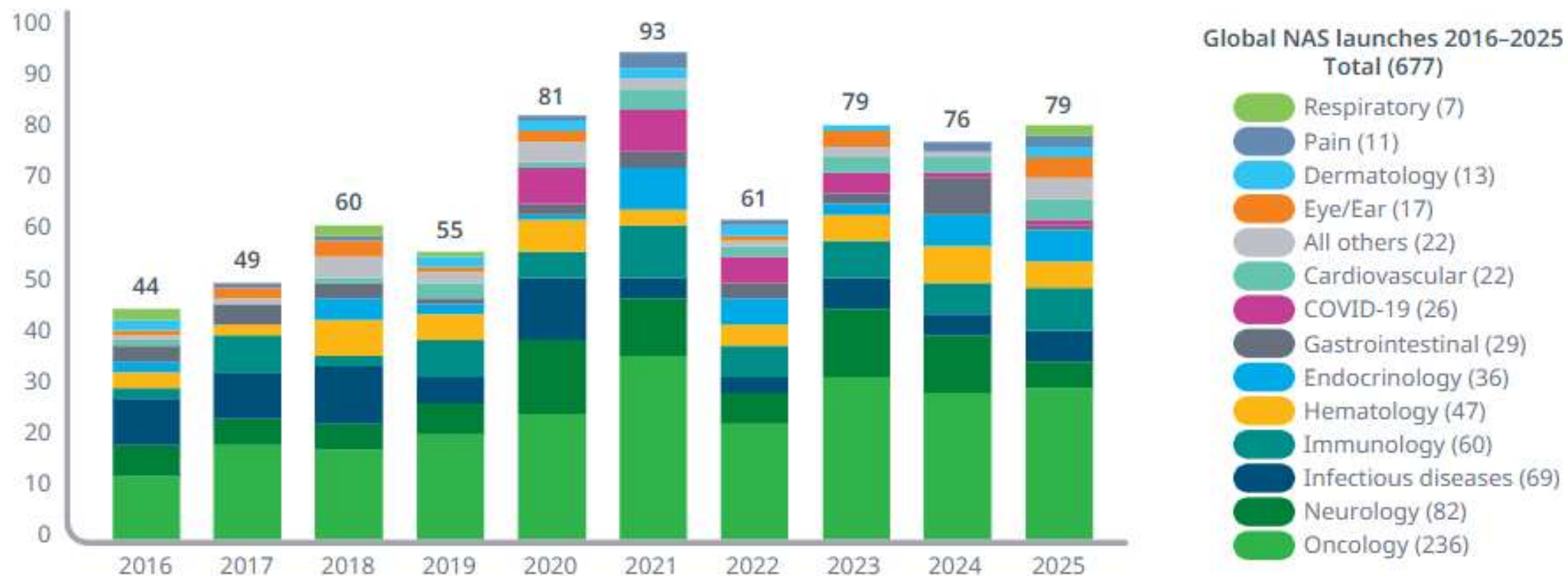
Source: IQVIA Institute, Jan 2026.

Exhibit 25: Obesity pipeline by program and characteristics



# A total of 79 novel active substances (NAS) were launched globally in 2025

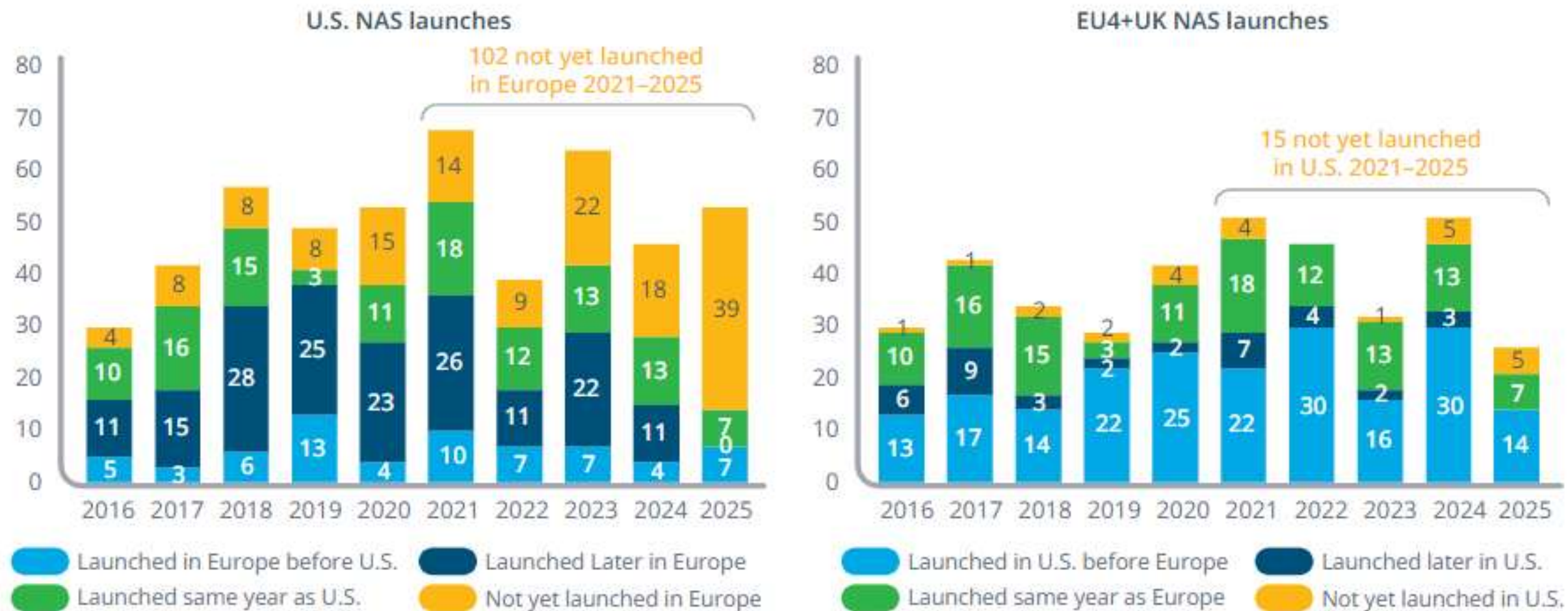
Exhibit 32: Novel active substances (NAS) launched globally by therapy area, 2016-2025



Source: IQVIA Institute, Feb 2026.

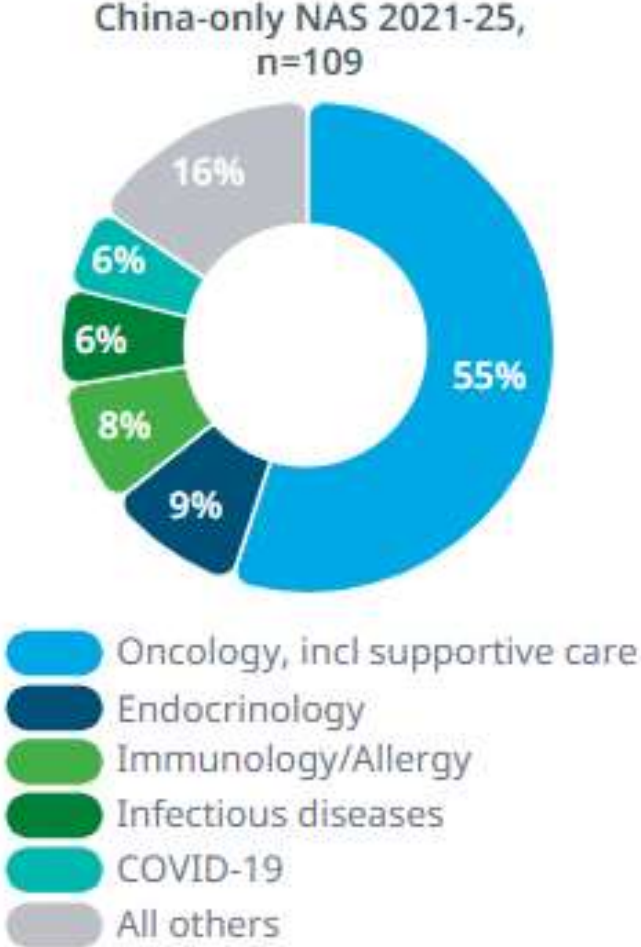
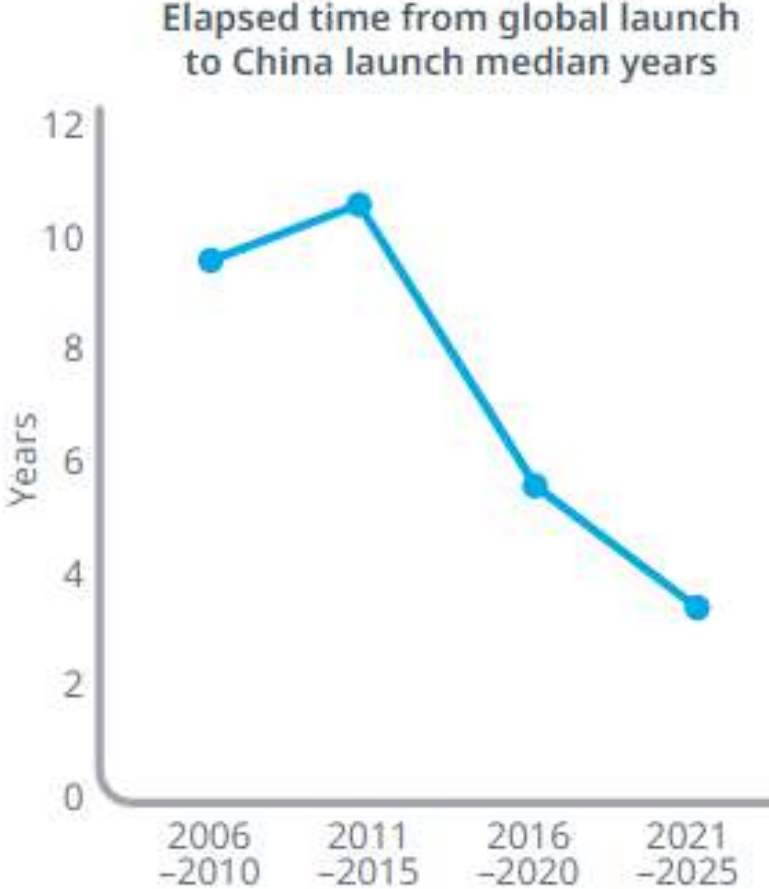
# Since 2021, 102 NAS launched in the U.S. are not available in Europe while 15 European NAS are not available in the U.S.

Exhibit 34: Novel active substance (NAS) launches in the U.S. and EU4+UK, 2016–2025



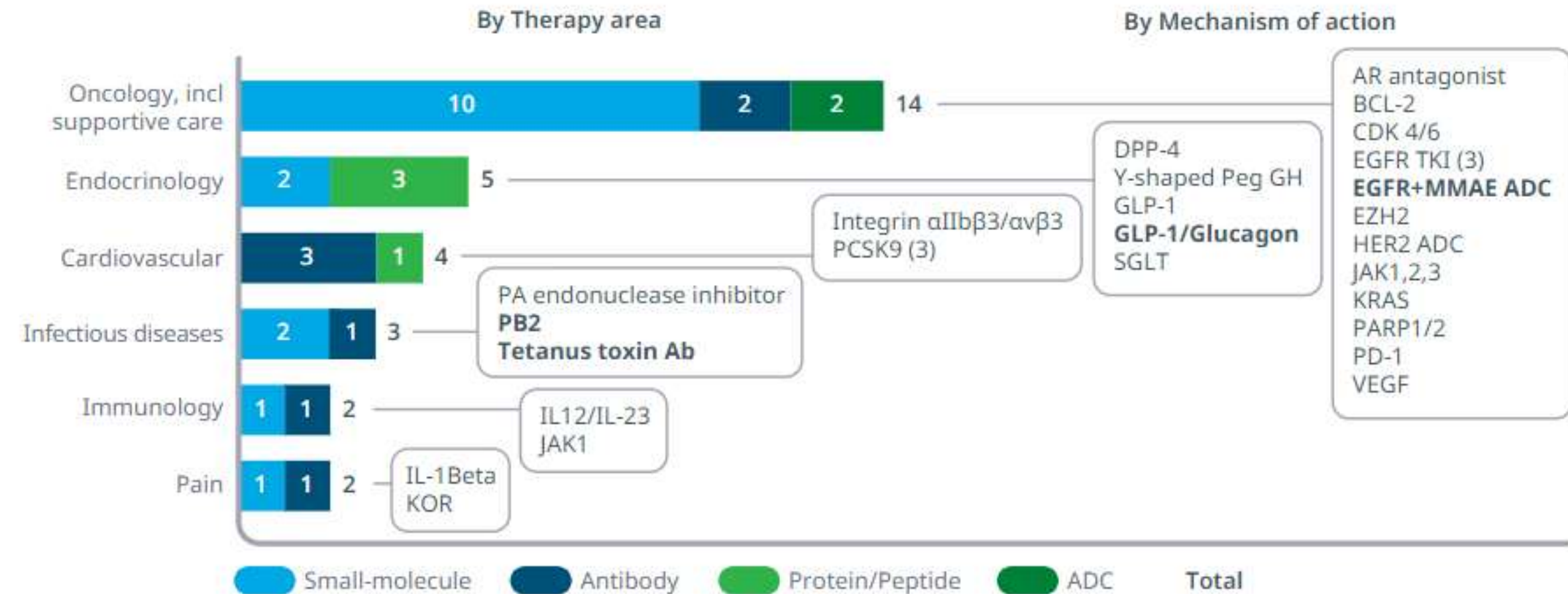
# China has closed a significant gap in time to launch for global NAS from a median 9.5 years in 2006-10 to 3.6 in the last 5 years

Exhibit 36: China novel active substance (NAS) launches 2006-2025



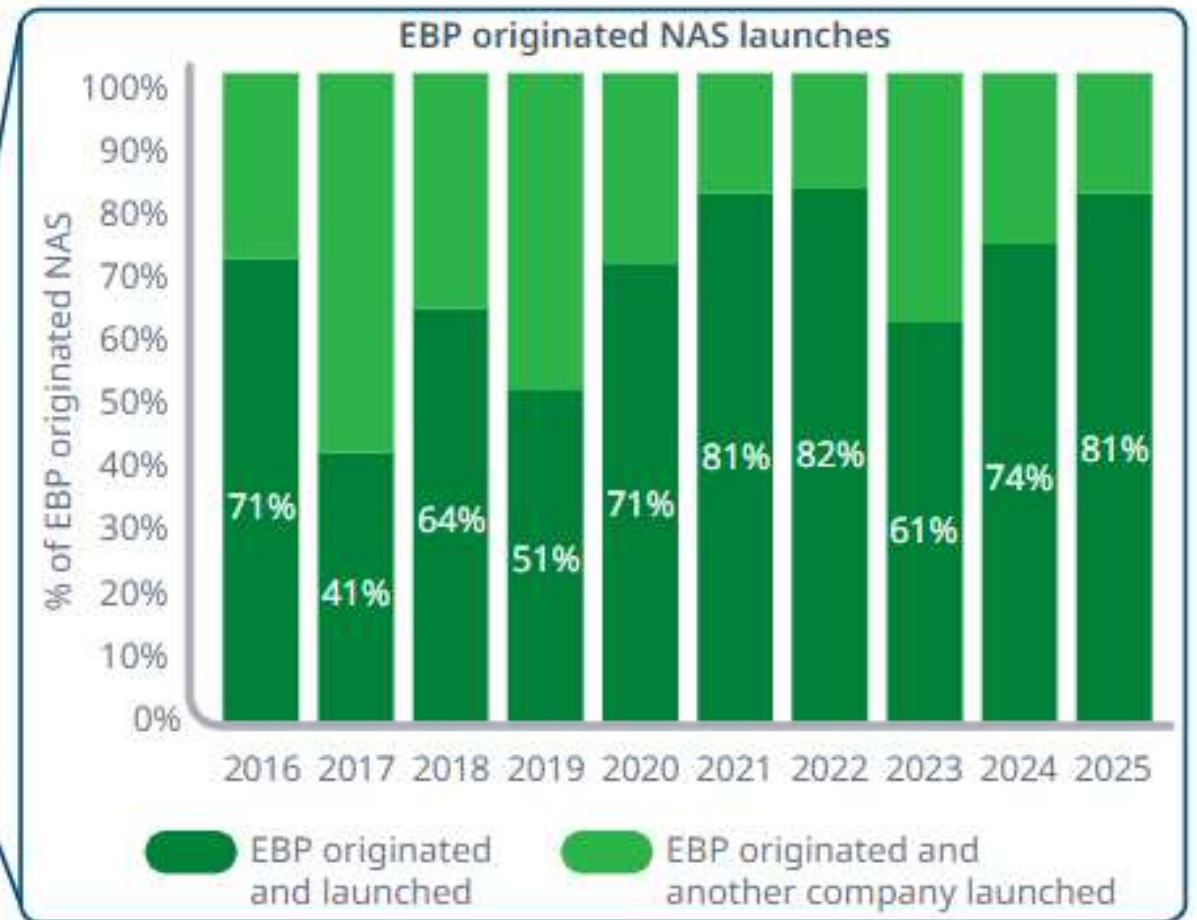
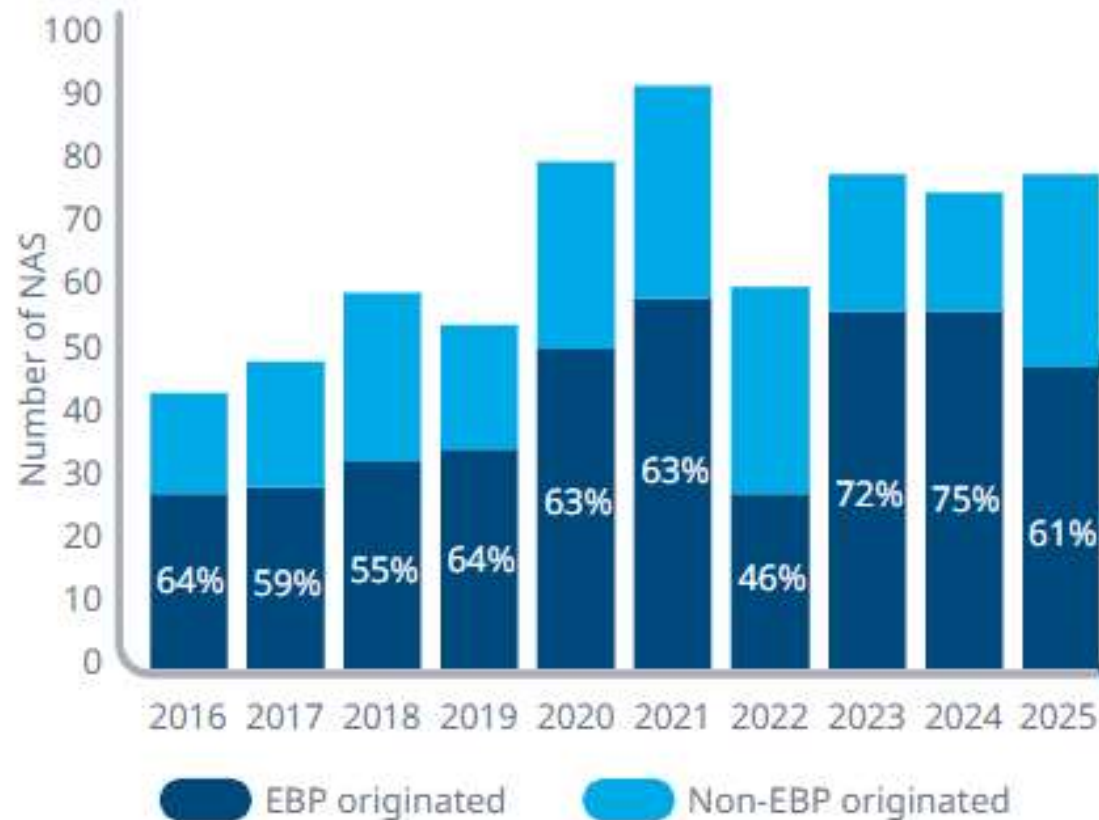
# There were 30 China-only NAS launched in 2025 including 14 in cancer and 4 notable first-in-class mechanisms

Exhibit 37: Novel active substances (NAS) launched only in China by therapy area, modality and mechanism, 2025



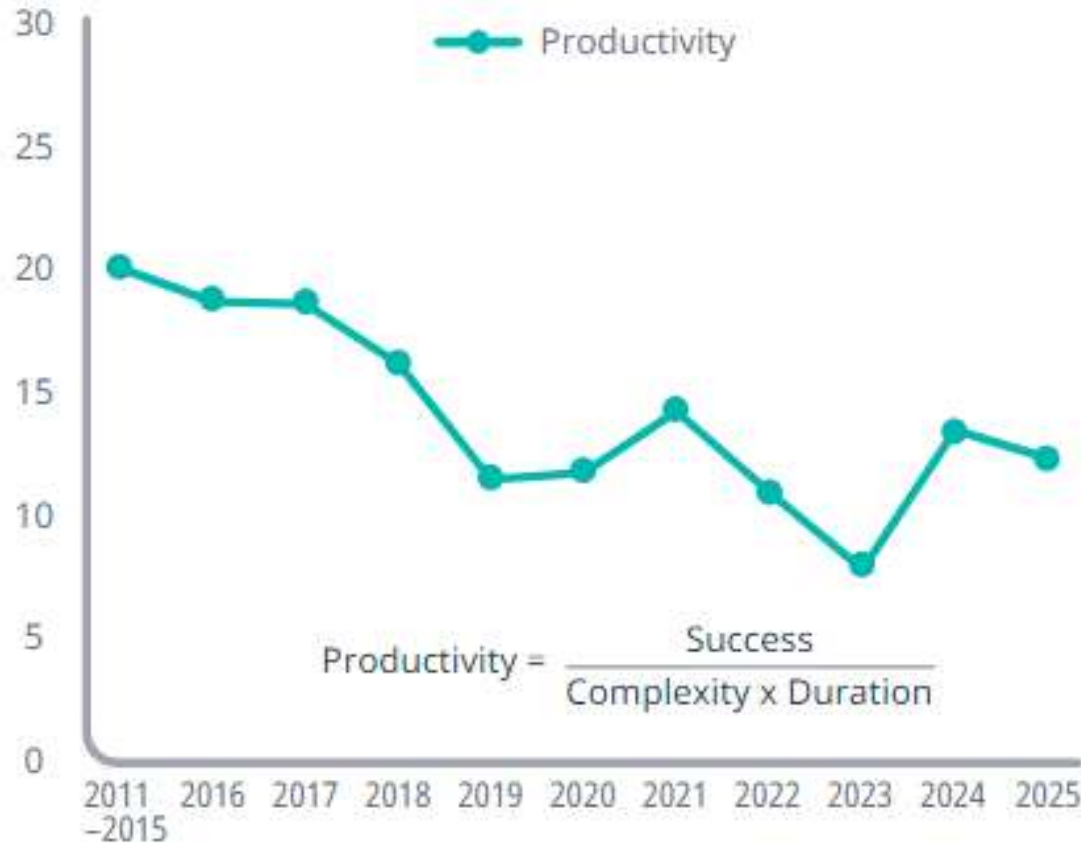
# Globally, emerging biopharma companies originated 61% of new drugs in 2025 and launched 81% of those they discovered

Exhibit 42: Companies originating and filing regulatory submissions for novel active substance (NAS) and percent of global launches by NAS launch year, 2016–2025



# Increasing duration drove a small clinical program productivity decrease in 2025, despite some improvement in trial complexity

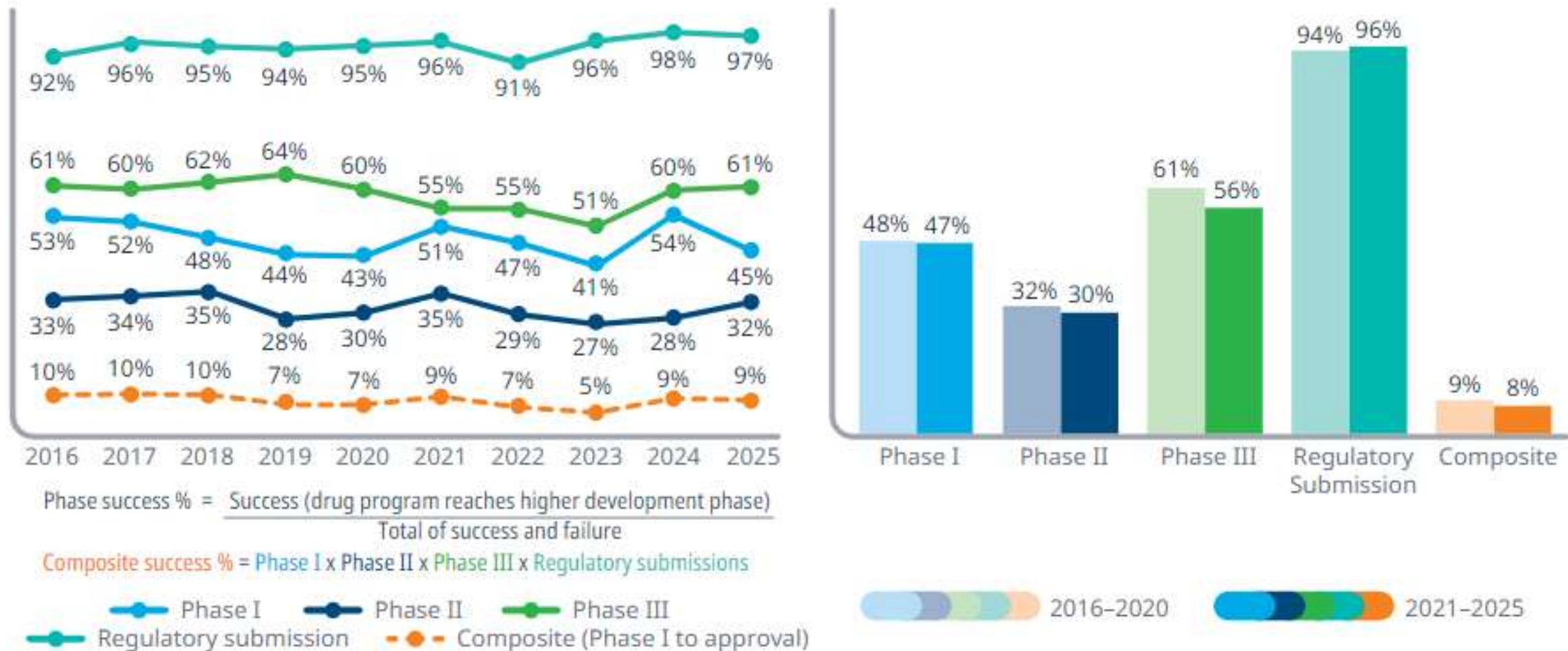
Exhibits 44: Clinical Program Productivity Index and elements of productivity 2016–2025 indexed to 2011–2015 average



Source: Citeline Trialrove, Pharmapremia, Jan 2026; IQVIA Institute, Jan 2026.

# R&D program success rates increased in Phase II and III in 2025, largely offsetting volatility in Phase I

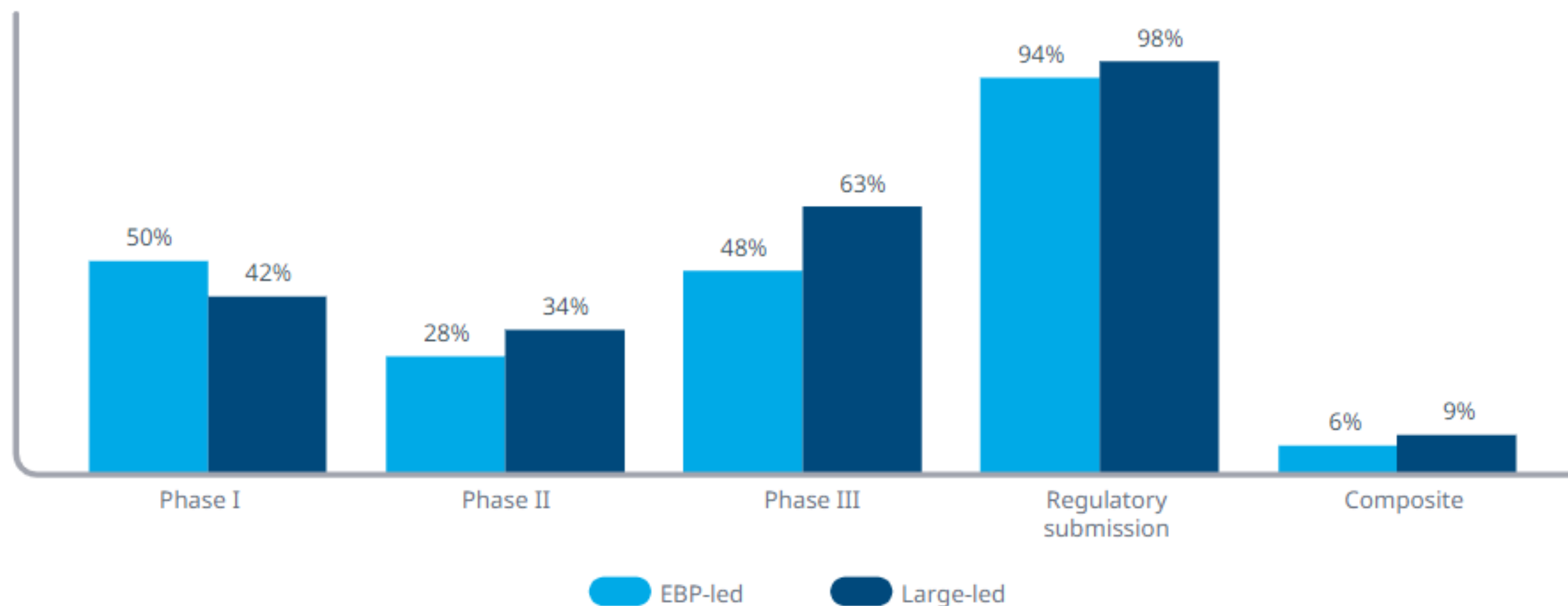
Exhibit 46: Program composite and between phase success rates, Phase I to approval, 2016–2025



Sources: Citeline Pharmapremia, Jan 2026; IQVIA Institute, Feb 2026.

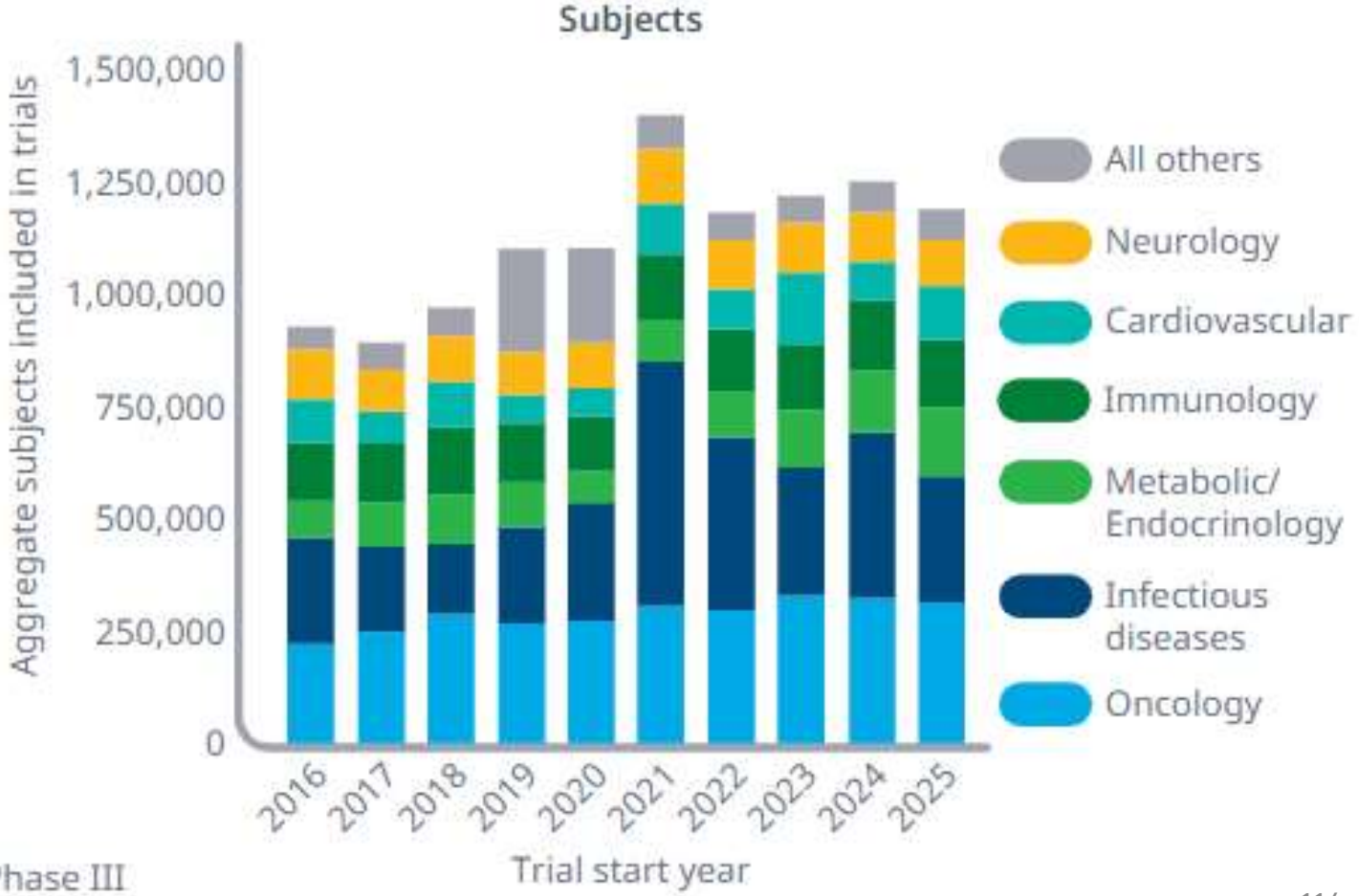
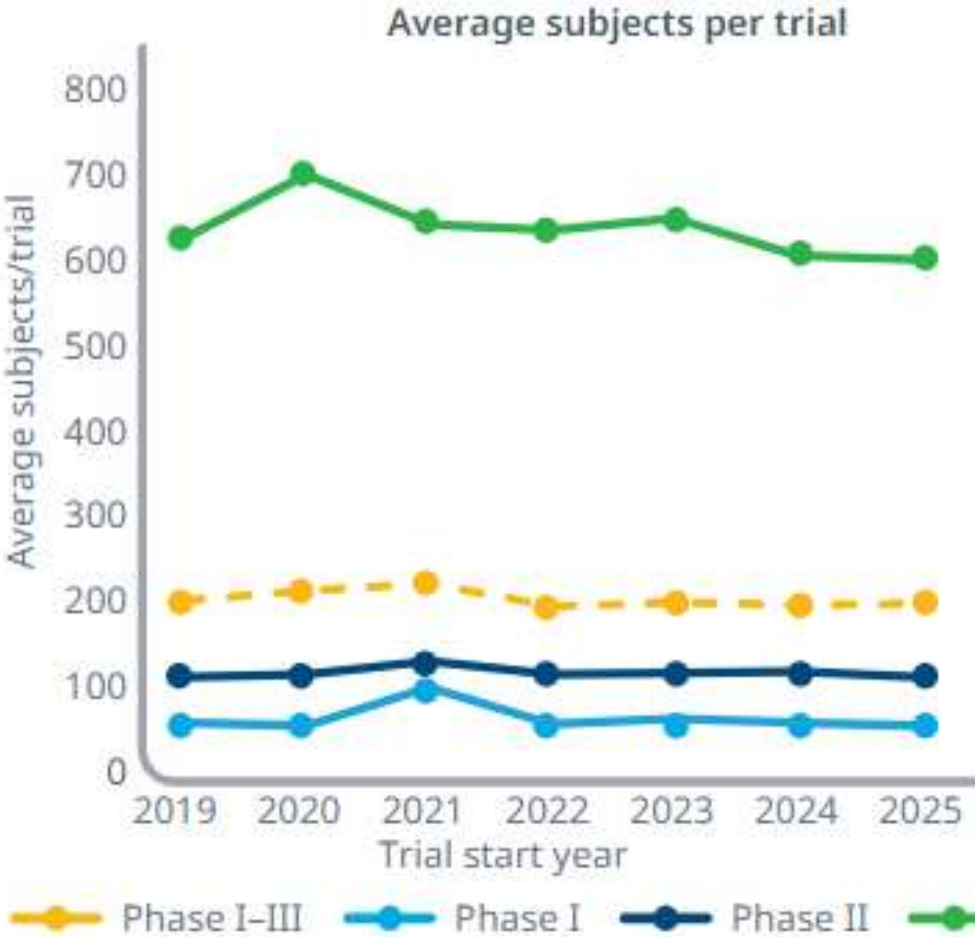
## Large pharma has a higher composite success rate than EBPs, and with attrition weighted more towards early development

Exhibit 49: Between phase success rates for EBP-led and large pharma programs, Phase I to approval, 2021-2025



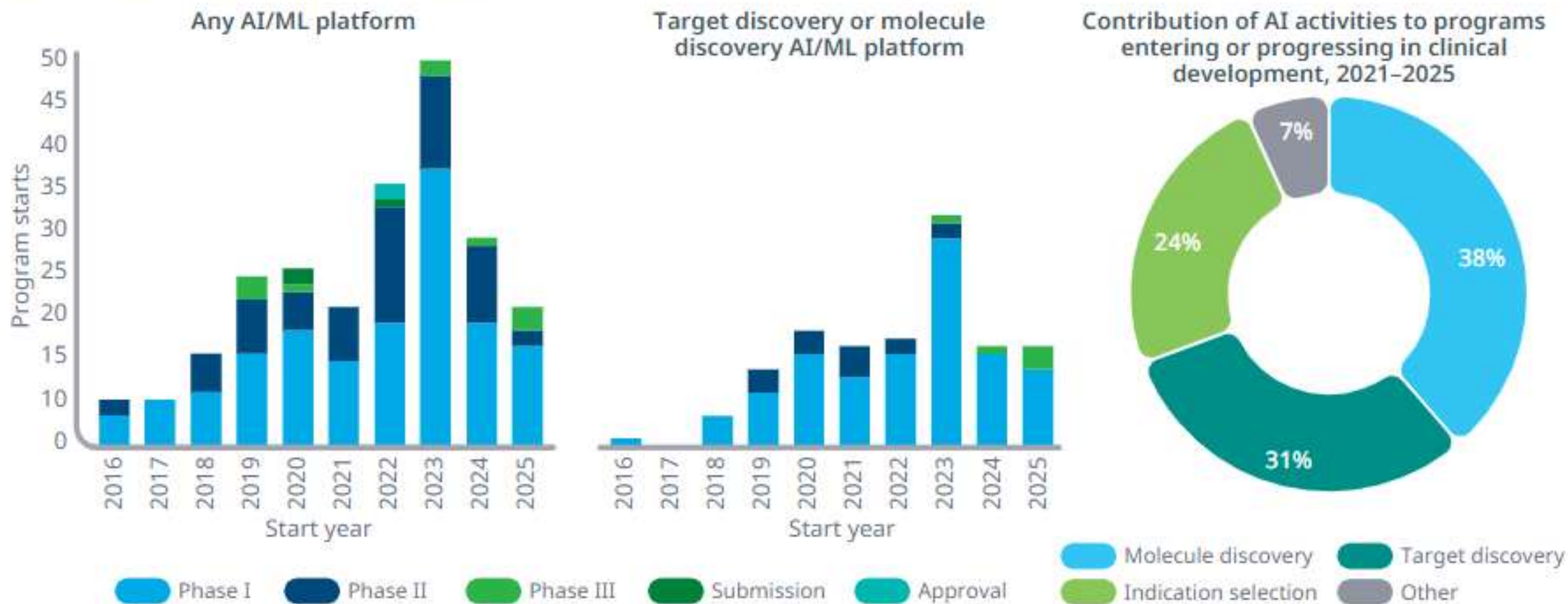
# Clinical trials started in 2025 will enroll 1.2 million participants, including over 300,000 in oncology

Exhibit 53: Clinical trial subject by phase and therapeutic area, 2019-2025



# Despite an increasing volume of clinical-stage AI/ML programs, few AI-discovered targets or molecules have reached late-stage

Exhibit 74: Clinical program phase entries by year for AI/ML R&D programs from R&D AI platform companies, by AI contribution type, 2016-2025



# Further Data on Trends in R&D

Cherry Blossoms, Stanford University Campus, March 2026





# LEK: Large Pharma R&D Productivity Below that of Other Biopharma

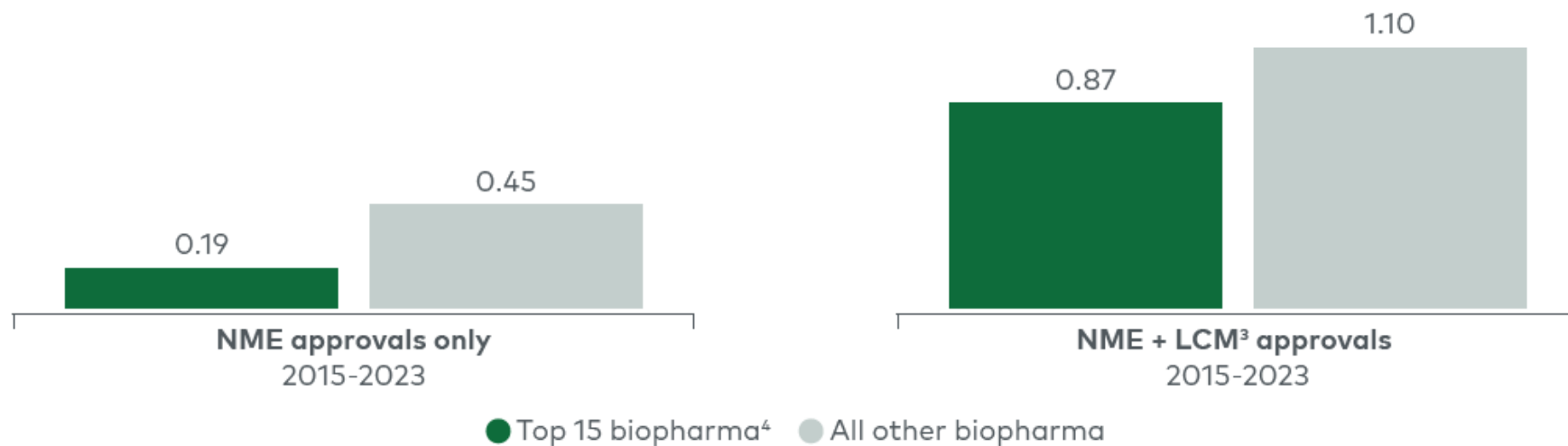
LEK, “Redefining Biopharma R&D Productivity,” Feb 2026, p. 3.

**Figure 2**

R&D efficiency: R&D investment per approval by company type, including number of NME and NME + LCM approvals per \$1B in R&D

**Approvals<sup>1</sup> per \$1B of R&D, by company<sup>2</sup> scale (2015-2023)**

Number of approvals per \$1B R&D spend

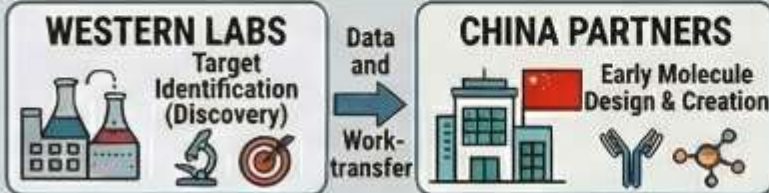


<sup>1</sup>Includes CDER and CBER approvals (vaccines and biologicals); <sup>2</sup>Approvals of acquired companies are included in NewCo company approval counts and revenues if approved after the acquisition date. <sup>3</sup>LCM includes new indication, new patient population, pediatric, and new route of administration; <sup>4</sup>Top 15 Biopharma companies were categorized based on biopharma revenues >\$25B in 2024; 2024 trends show a continuing decrease in NME approvals per \$1B of R&D spend with Top 15 Biopharma falling to 0.1 and All Other Biopharma pharma falling to 0.3  
Source: FDA, company investor presentations and SEC filings

# How Three Pharma Companies are Shifting R&D Decision-making



## AstraZeneca: Decentralized Strategy and Internal Operational Advantage



### Outsourcing of Early Molecule Design



**Multi-TA Frontal Attack:** Massive attack on many TAs simultaneously for scale and efficiency.



NOT OUTSOURCED

**Internal Advantage:** executing large, late-stage global trials with internal teams.

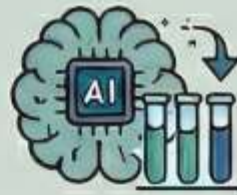
Efficiency **does not** require failing fast faster.



## Merck: Enhanced Balanced Attack and High-Tech Efficiency



**Maintain full research footprint:** Not shrinking, investing more to learn new biology.



**Using AI for Efficiency:** Improve Phase 1 & 2 success rates.



**Run numerous Phase 1 trials:** Intentionally to 'fail fast' and select the best candidates.



**Comprehensive balanced pipeline:** Respond to biosimilar competition through diverse sourcing.

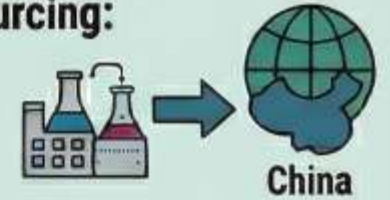


## Pfizer: Strategic Focus and External Sourcing



**R&D Efficiency Focus**  
Shifting to strategies focused on higher productivity with lower costs at key sites in Groton and San Diego

**Expand external sourcing:** Investing more in collaborations, especially China-sourced molecules.



ADC



Obesity

**Strategic bets on ADCs & Obesity:** Focused investment in areas for future growth.



**Outcome-driven:** Aiming to reduce Phase 3 trial risk in selected areas.

# Citeline: Count of R&D Projects Declined in 2025 For the First Time in Three Decades

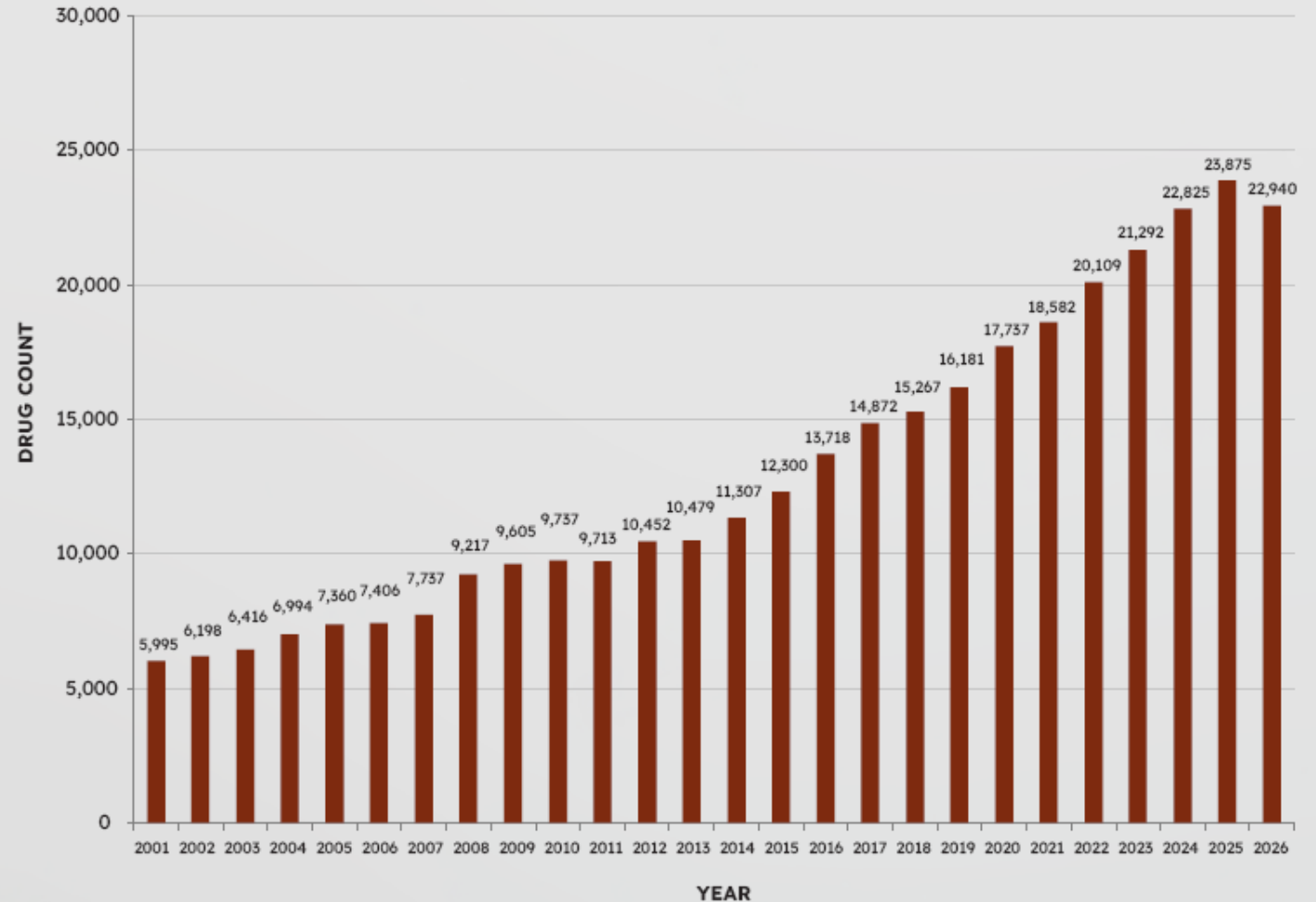
Here, we are counting all drugs disclosed as being in development by pharmaceutical companies, from those at the preclinical stage, through the various stages of clinical testing and regulatory approval, and up to and including launch.

Launched drugs are still counted, but only if they are still in development for additional indications or markets. Drugs whose development has been terminated, or is complete, are not included. All data were collected Jan. 2–7, 2026.

The headline figure we start with is always the total number of drugs in R&D (Fig. 1), and this year, there's a slightly different flavor to our produce. The total number of pipeline plants on our drug farm is actually slightly lower than it was this time last year, clocking in at 22,940. This represents a 3.92% fall from 2025's figure, nearly reversing the 4.60% increase seen from 2024 to 2025. This is the first time we've seen a drop since the mid-1990s.

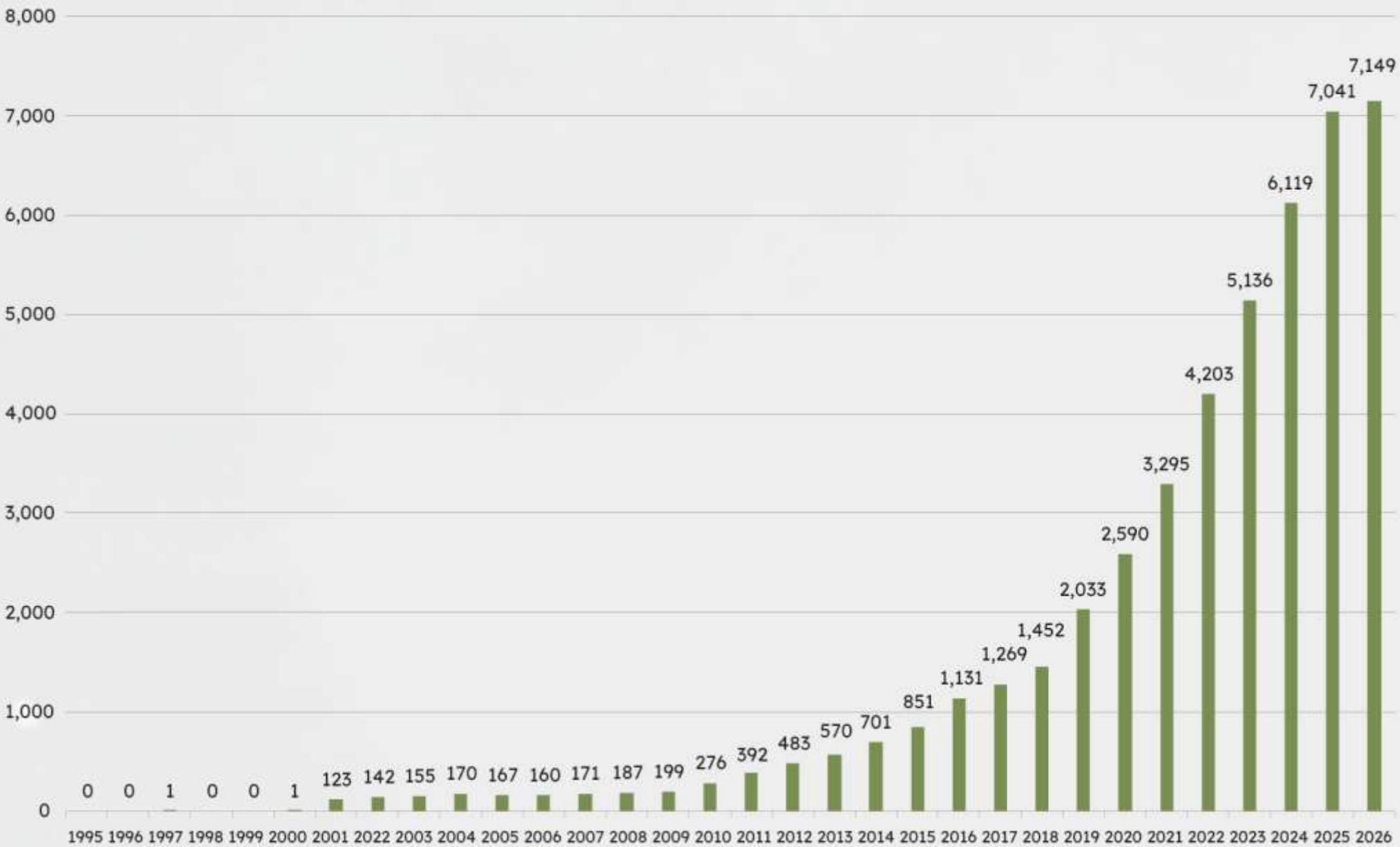
Source: Citeline 2026 R&D Report

Figure 1: Total R&D pipeline size by year, 2001–26



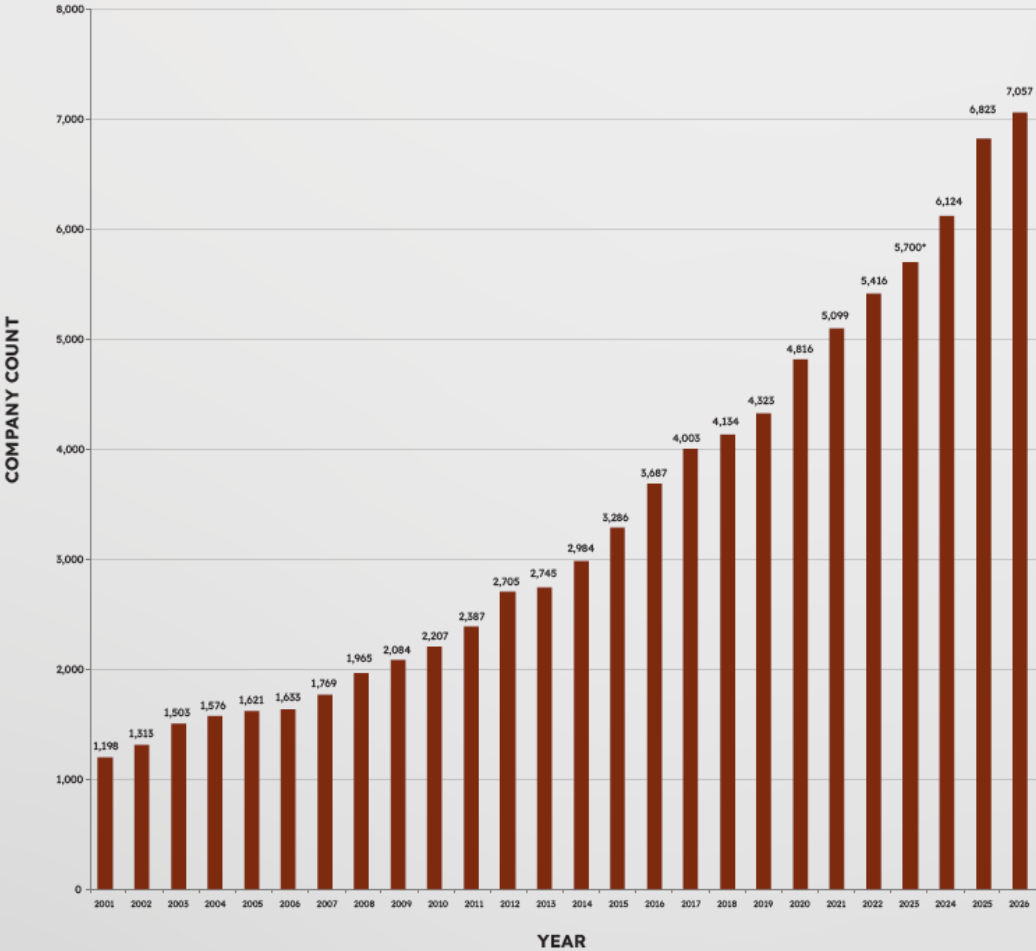
Source: Pharmaprojects, January 2026

Figure 29: Total China R&D pipeline size, 1995–2026



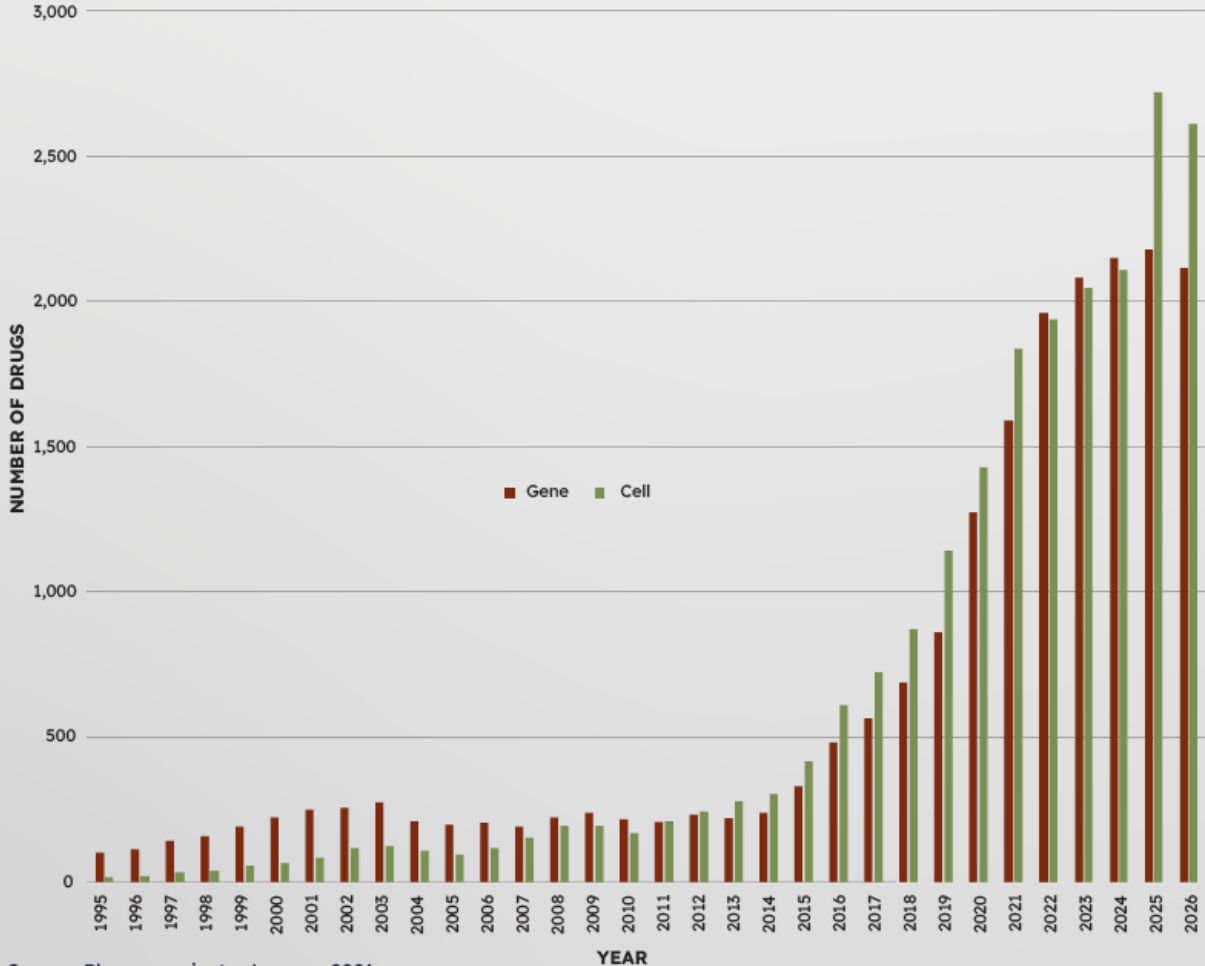
# Citeline: Count of Biopharmas Developing Pipeline Rising as is the Size of the Cell and Gene Therapy Pipeline

Figure 5: Total number of companies with active pipelines, 2001–26



Source: Pharmaprojects, January 2026

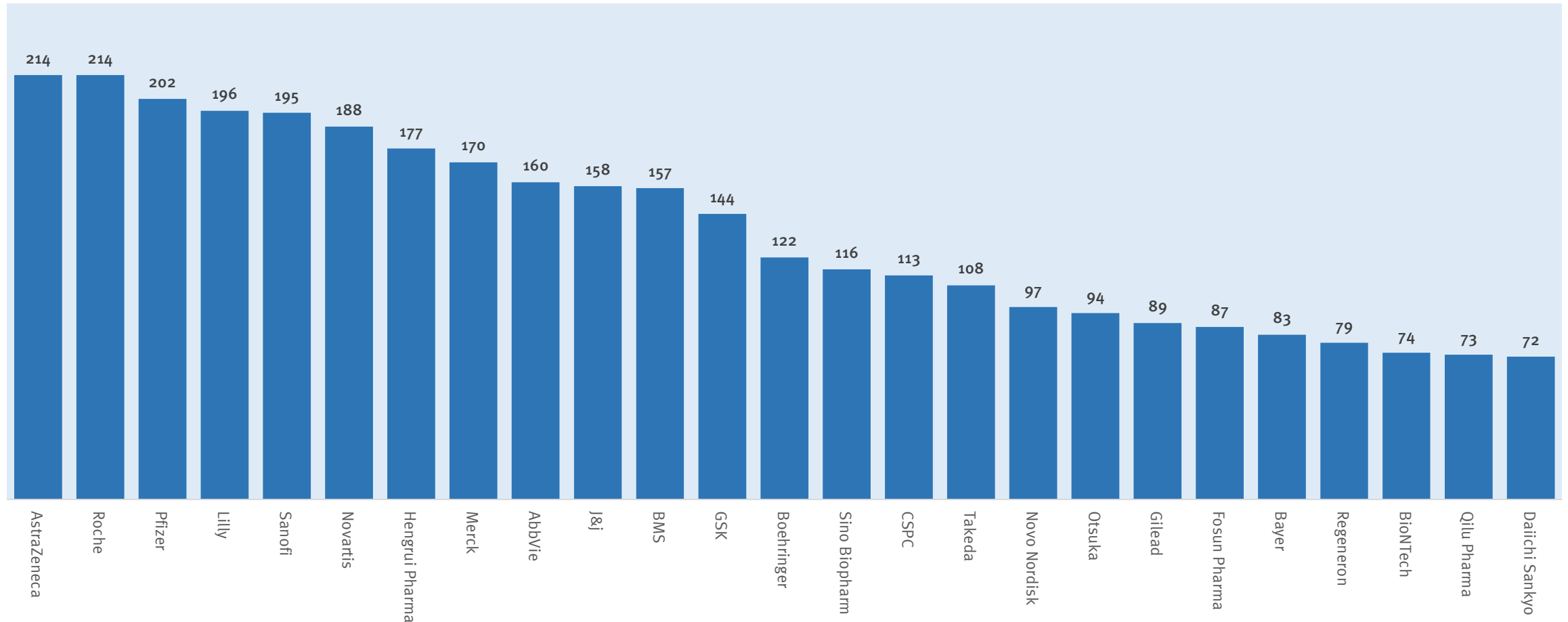
Figure 16: The rise of cell and gene therapies



Source: Pharmaprojects, January 2026

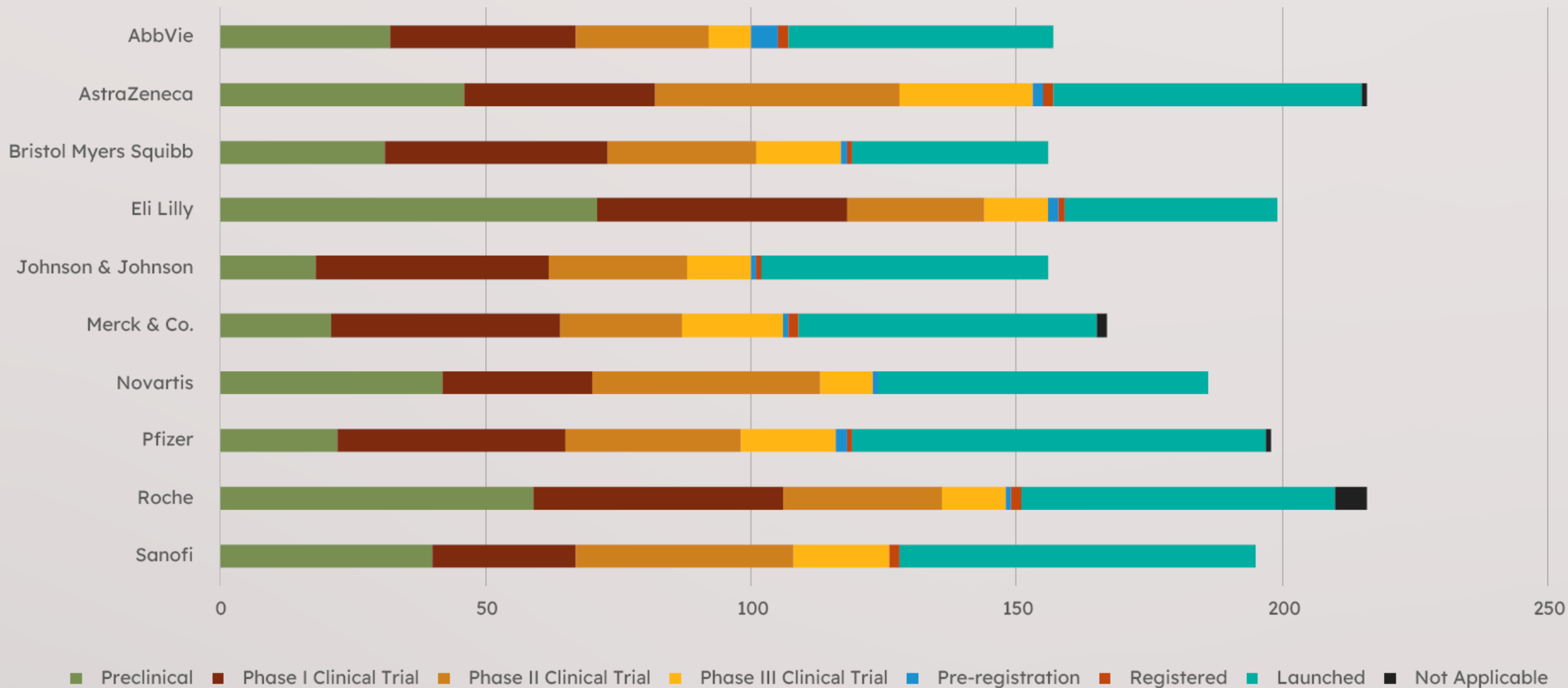
# AZ, Roche, Pfizer and Lilly Have the Largest Pipelines

Count of Drug Candidates in Pharma Pipeline, 2026

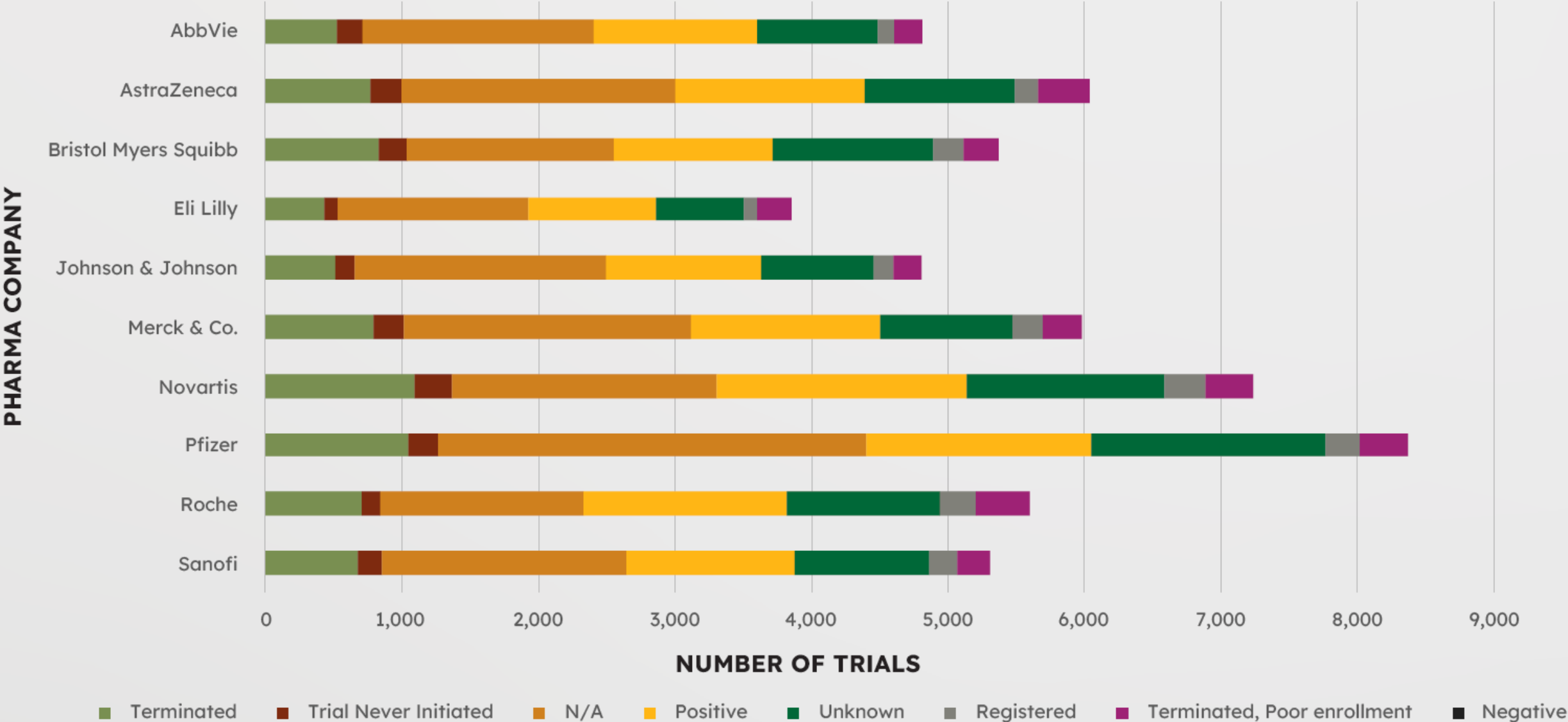


Source: Citeline R&D Report, Jan 2026, <https://www.citeline.com/en/rd26/>

**Figure 22: Top 10 companies by phase of development**



**Figure 27: Historic trial outcomes for top 10 pharma companies**



Source: Citeline R&D Report, Jan 2026, <https://www.citeline.com/en/rd26/>

# Key Criteria That Pharma Use in Deciding Whether to Proceed with Clinical Trials After Phase 1 and Phase 2.

Most companies create a map showing what they expect the future standard of care for a disease to look like in eight to twelve years time based on competitive intelligence analysis. They then compare the emerging profile from Phase 1 and Phase 2 trials to the target product profile derived from competitive intelligence analysis.

## Proof of Mechanism and Target Engagement

- Is the drug hitting its target and modulating the relevant pathway? Biomarker data important.



## Efficacy and Safety Signals

- Does the required efficacious dose leave enough safety margin? Are there unexpected off-target effects? How is the PK?



## TPP Viability

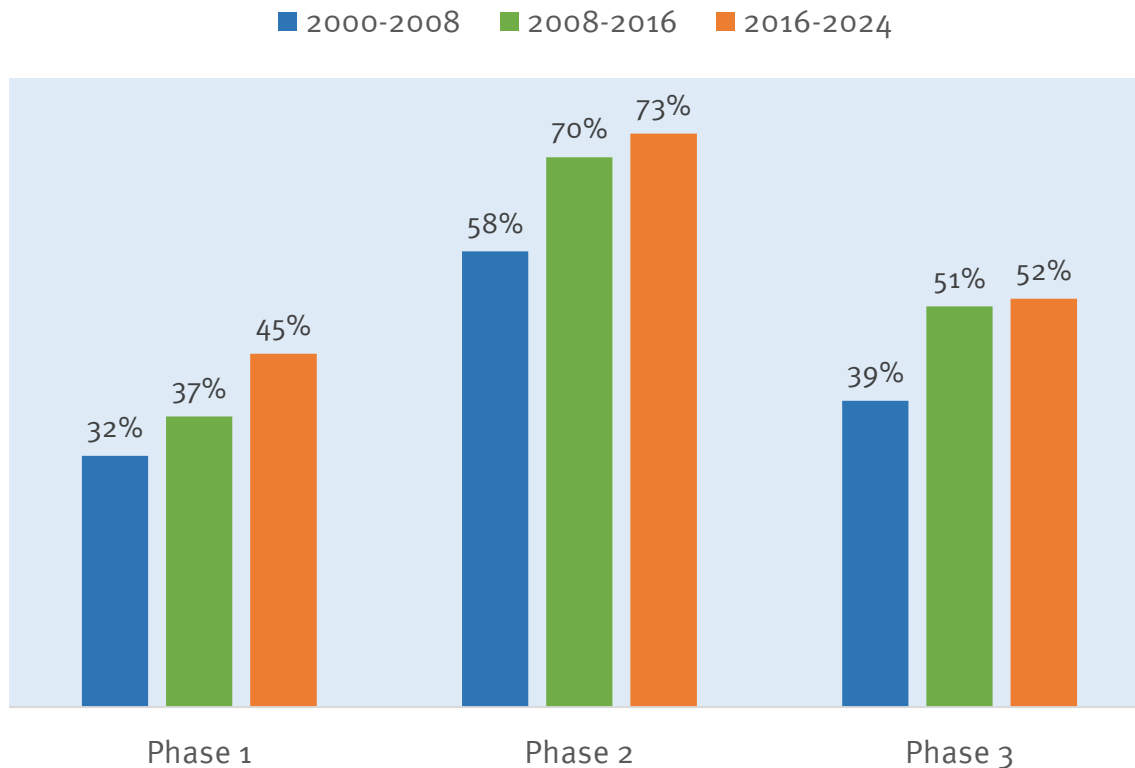
- Does the emerging profile indicate that the drug can meet minimum viable requirements to differentiate from the future standard-of-care?



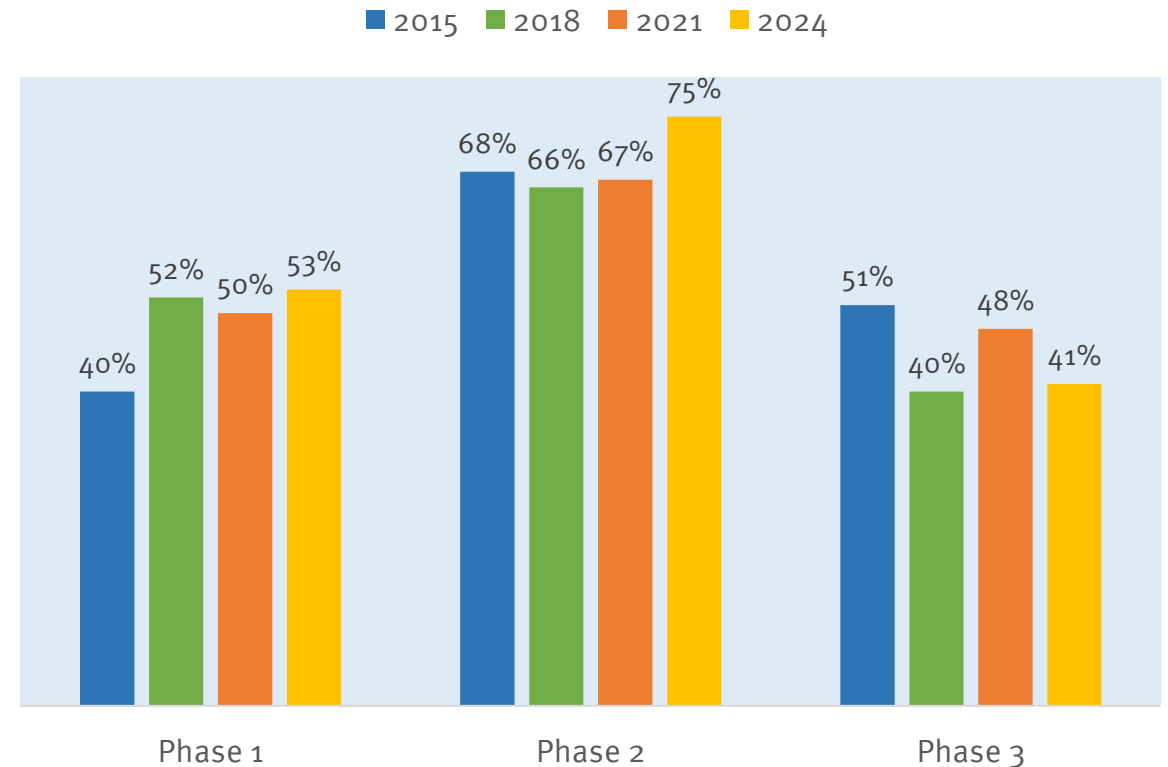
# Compounds are Being Stopped Sooner in Last 10 Years

Clinical trial success rates are going down overall. Zhou et.al., looked at Pharmaprojects data and clinicaltrials.gov data and found that failure rates are going up at all stages. If drugs were failing faster then we would see failure rates fall for Phase 3 but rise for Phase 1. In contrast, IQVIA reports annual data starting in 2015 and notes that Phase 3 failure rates are down while Phase 1 and Phase 2 failure rates are up.

Zhou et.al. Study (2025): Average Failure Rates by Clinical Trials Stage, 2000 to 2024



IQVIA Institute (2025): Average Failure Rates by Clinical Trials Stage, 2015-2024



# Go/No Go Decision-making by Therapeutic Areas

Tailoring the go/no go decision processes to the specific challenges and data characteristics of different therapeutic areas is critical for development success and risk mitigation.

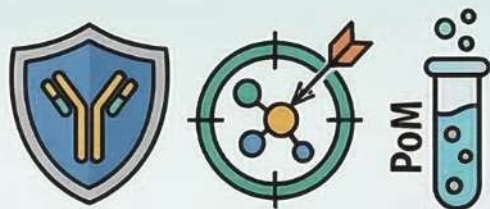
## ONCOLOGY CRITERIA

**Very fast** go/no go timelines, relying heavily on ORR data from small, genetically defined patient cohorts.



## IMMUNOLOGY CRITERIA

**Reasonably fast** go/no go decisions, based on translational biomarkers to prove target engagement.



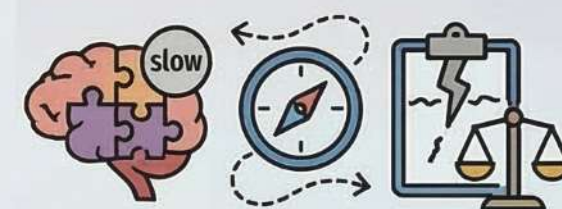
## CARDIOVASCULAR CRITERIA

**Slower go/no go progression**, because biomarker data do not always correlate with long-term efficacy.



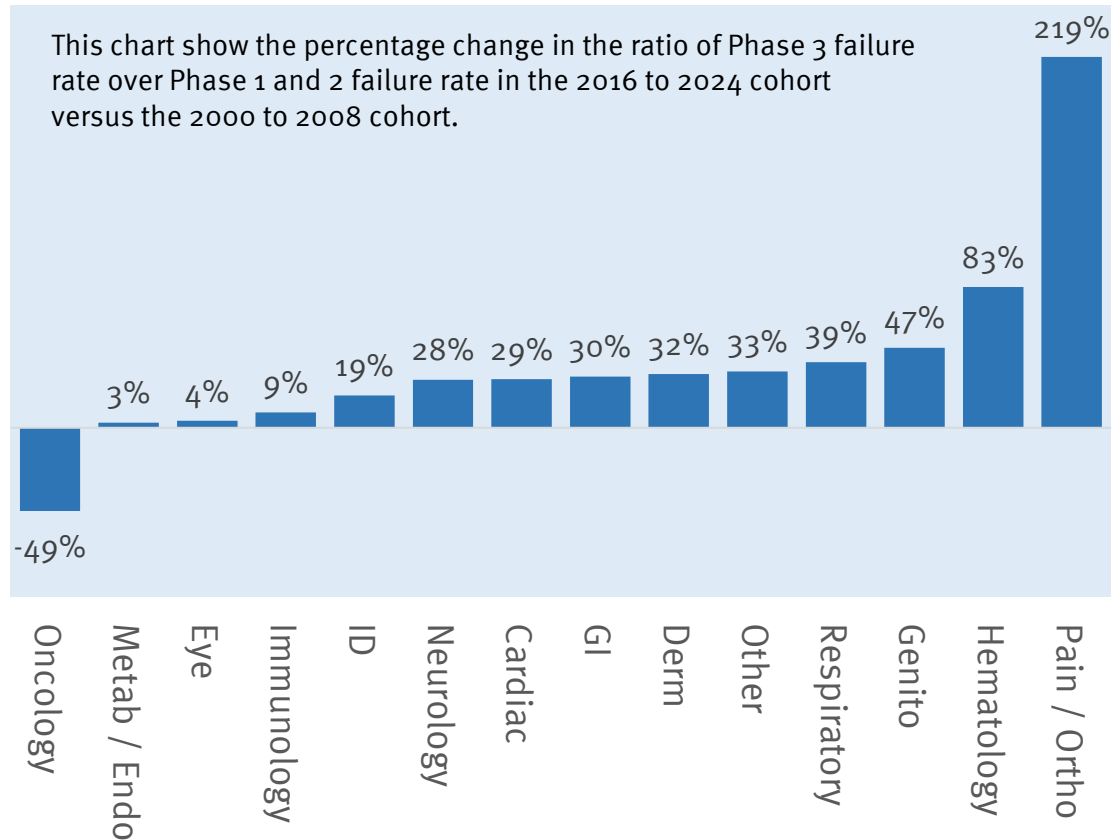
## NEUROLOGY CRITERIA

**Very slow decisions**, plagued by not ideal biomarkers and challenging clinical endpoints.

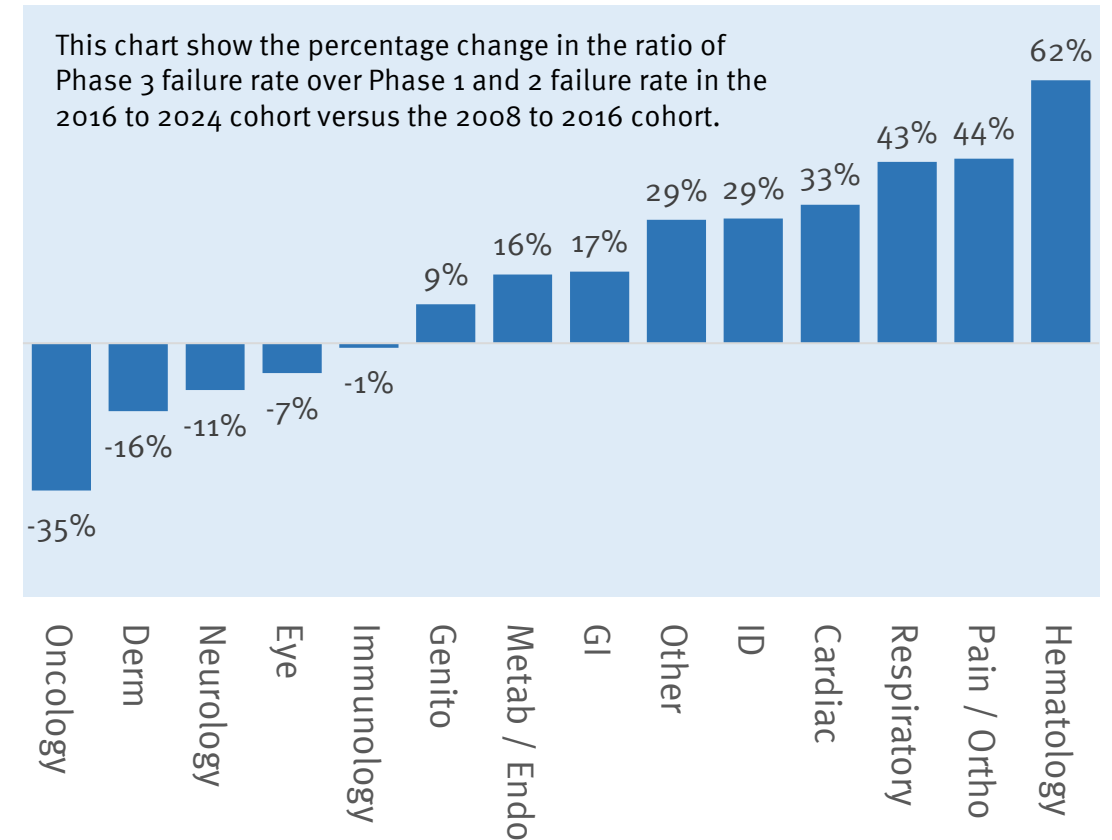


# Oncology Studies Most Marked in Tendency to Stopping Sooner. Most TA's are Seeing the Opposite

Change in Ratio of Late Failure to Early Failure, Last 16 Years (Zhou et.al. Data)



Change in Ratio of Late Failure to Early Failure, Last 8 Years (Zhou et.al. data)



Sources: Ying Zhou et.al., "Dynamic Clinical Trial Success Rates for Drugs in the 21<sup>st</sup> Century,, *Nature Communications*, Oct 29, 2025, Supplemental Table 6 and later.

# Disclosure

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