LifeX®

Propelling Early-Stage Life Science Innovation

FORWARD

A Transformational Development Continuum

www.lifexglobal.com

Propelling Early-Stage Life Science Innovation

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LifeX®

Introduction

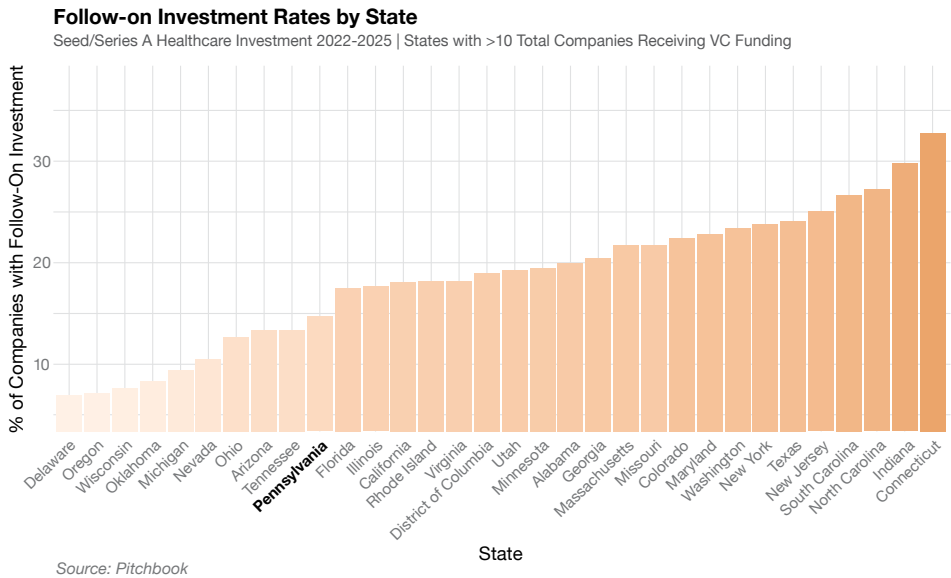
The early-stage life sciences investment landscape is undergoing a fundamental shift.

As venture capital firms increasingly concentrate their resources in later stage companies with reduced risk profiles, early-stage life science startups face growing challenges in accessing the capital and expertise needed to reach critical development milestones. The shift of investors moving to later stage, more risk averse companies is shown most notably by the median post-money valuation increase nearly 4x from $4.4M in 2010 to over $20M in 2025[1]. This environment has disproportionately impacted startups in emerging regions like Pennsylvania, where high-potential technologies often struggle to advance due to limited regulatory guidance, a shortage of experienced leadership, and constrained access to early-stage capital and follow-on investments, as shown in Figure 1.

To keep pace with rapid advancements in life science discovery, models advancing the development of startups based on these world-impacting innovations must evolve. LifeX®, a Pittsburgh-based organization, founded in 2017, that also serves as the Life Science Greenhouse for Western PA, has pioneered a continuum-based platform designed to drive early-stage ventures from concept to commercialization. LifeX's integrated platform is built on three core pillars, active engagement, a curated network of domain experts and partners, and strategic investment capital. These pillars work together to propel early-stage startups from concept to commercialization though an integrated approach combining targeted investment, milestone-driven programming, and embedded operational leadership.

This document explores the national and regional trends shaping life sciences venture capital, highlights the unique structural gaps that hinder startup progress, and presents the LifeX Platform as a solution to accelerate innovation, de-risk ventures, and unlock economic growth across Pennsylvania's bioeconomy.

Figure 1



Source: Pitchbook

[1] PitchBook Data, Inc. (2025). *Post Money Valuation Increase* Retrieved May 15, 2025, from PitchBook database.

The Early-Stage Funding Gap:
A Shift Towards Risk Aversion

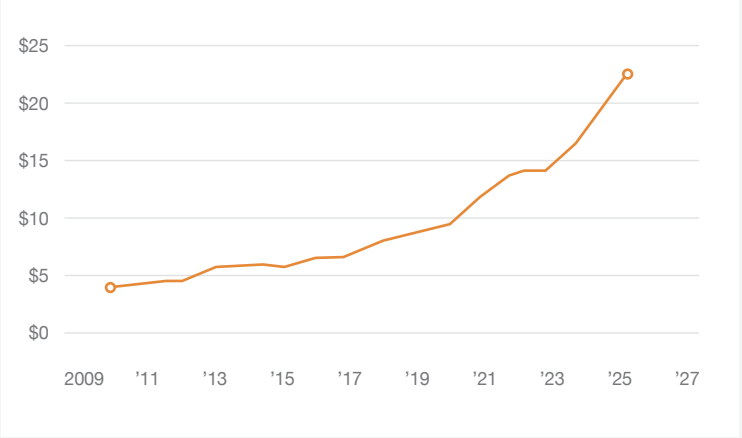
Over the past decade, early-stage life science investment has undergone a structural shift.

Venture activity in life sciences has steadily declined in recent years, with the concentration of capital becoming increasingly focused on the geographic centers on the east and west coasts, with Figure 2, illustrating the resulting funding gap faced by underserved regions like Pennsylvania.

Another clear trend is that Life Science VCs are increasingly focusing on later-stage opportunities. Early-stage companies are now expected to advance further, reduce technical and regulatory risk, and demonstrate greater capital efficiency before securing investment. As shown in Figure 3, the median Seed post-money valuation has risen from $4.4M in 2010 to over $20M in 2025[1], representing investors preference to engage with more mature companies.

Figure 3

Median Seed Valuation
(in millions of $s)

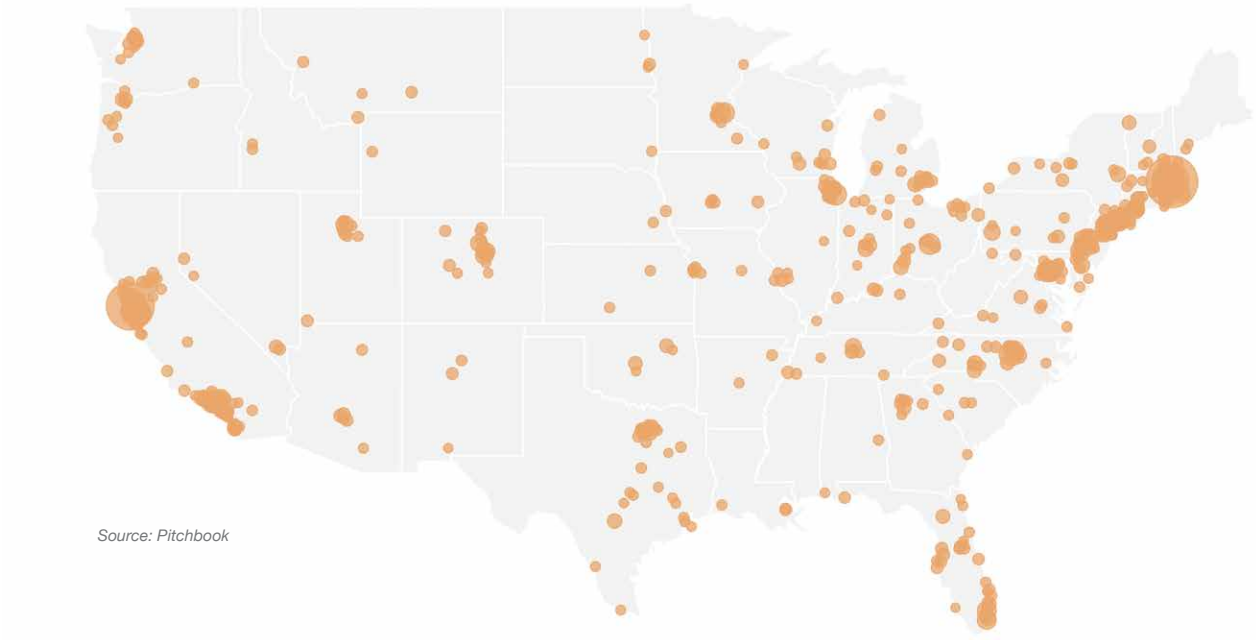


According to PitchBook data, annual seed deal volume has climbed from 161 in 2010 to 914 in 2024. This national trend, however, is less pronounced in Pennsylvania, where seed activity has not kept pace with broader market growth and capital remains more limited. Over the same period, the national average capital invested per seed deal has more than doubled, increasing from $1.2 million to $3.0 million[2]. Collectively, these trends suggest a more cautious investment environment, particularly in Pennsylvania, in which early-stage life science startups must achieve significantly more before receiving their first institutional check.

Figure 2

Geographic Concentration of U.S. Venture Capital Dollars

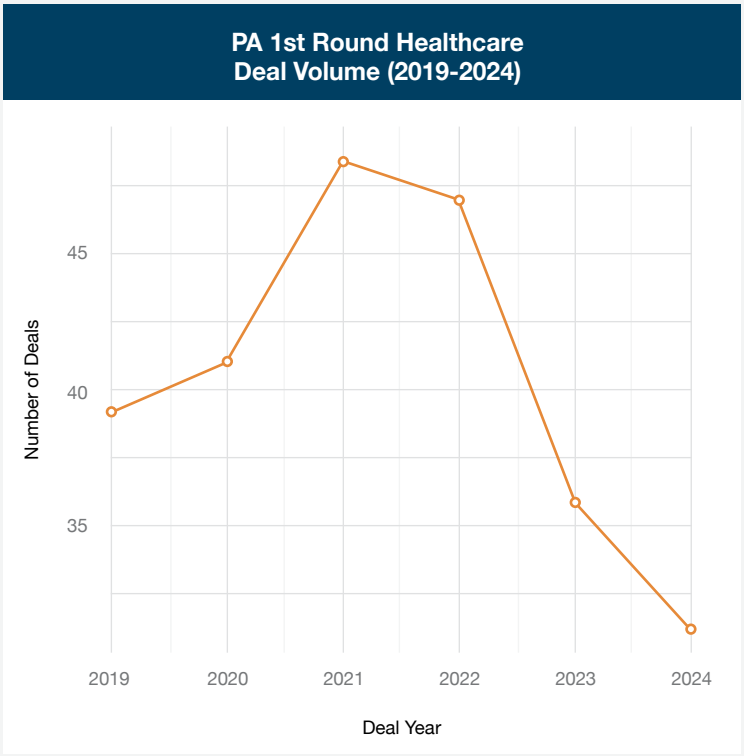
Seed/Series A Healthcare Investment 2022-2025 | Circle size reflects total capital invested per metro area



Source: Pitchbook

[2] PitchBook Data, Inc. (2025). *Post Money Valuation Increase* Retrieved May 15, 2025, from PitchBook database.

Figure 4



The Startup Response:

Navigating the "Valley of Death" in PA

These challenges are especially evident in Pennsylvania, where early-stage life science startups are experiencing pronounced declines in deal volume, longer fundraising timelines, and greater difficulty securing follow-on capital.

In Figure 4, years 2020–2022 are marked by a euphoric period for venture investment across life sciences and other sectors, fueled by historically low interest rates that stimulated capital deployment.

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The Startup Response:

Navigating the Valley of Death in PA

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However, in 2023 and 2024, first-round (pre-seed/seed) deal volume, fell dramatically below pre-COVID levels, with projections indicating that 2025 may be the worst year yet. This contraction signals a fundamental shift in venture behavior: life science venture capital is becoming increasingly selective, especially when it comes to early-stage startups.

As of September 2024, VC firms had raised just $11.7 billion across 22 funds, down sharply from $18.3 billion and 63 funds in 2023[3]. This marks the slowest fundraising pace since 2019 and underscores the tightening of available capital.

Deal volume is not the only factor affecting early-stage life science companies. The time between venture rounds has also steadily increased since 2021 as shown in Figure 5[4]. This has shifted founders to raising larger investment rounds that have clear and defined milestones to incentivize investors to invest. This has been a struggle for early-stage companies to solidify a strong strategic plan and investment round that will attract investors as well as give start-ups the needed runway to allow for adequate time to reach an inflection point and receive follow-on investment.

Each month that passes a company's probability of success drops. Figure 6 displays this paradigm. The data highlights the need for sustained capital injection and hands-on expert guidance to help companies reach critical milestones and secure follow-on funding.

Life Science investment is showing a clear decline in deal volume, time between deals, and favoring larger round sizes. This focus can be attributed to investors becoming more risk averse with key areas of risk cited, including potential regulatory hurdles, evidence of compelling clinical data and validation, clarity around commercial opportunity, and market need validation.

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[3] Ernst & Young. (2024). *Biotech outlook: Investment trends in a shifting market.* Retrieved from https://www.ey.com/en_us/life-sciences/biotech-outlook

[4] KPMG Private Enterprise. (2025, January 15). *Venture Pulse Q4 2024: Global analysis of venture funding.* KPMG International. https://assets.kpmg.com/content/dam/kpmg/kz/pdf/2025/03/Q4-2024-Venture-Pulse.pdf

Figure 5

Median Time Between Venture Rounds by Year

Based on healthcare sector data 2021-2024

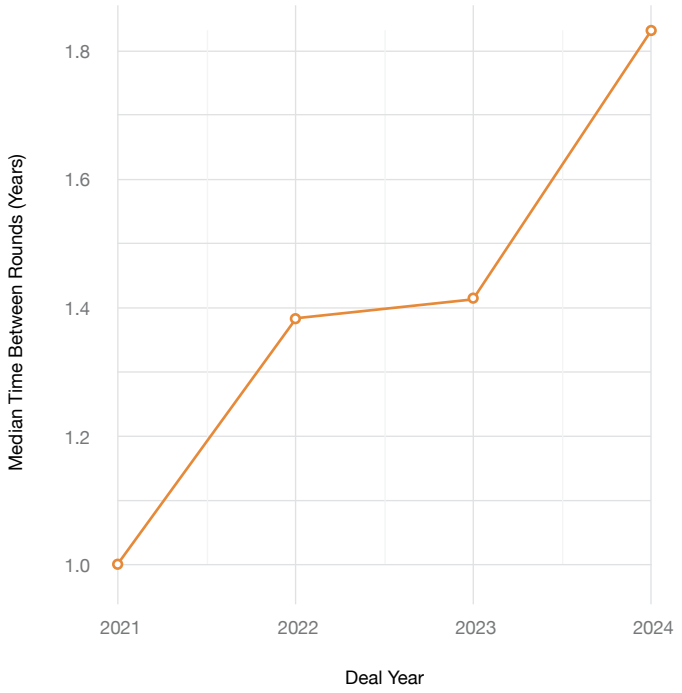
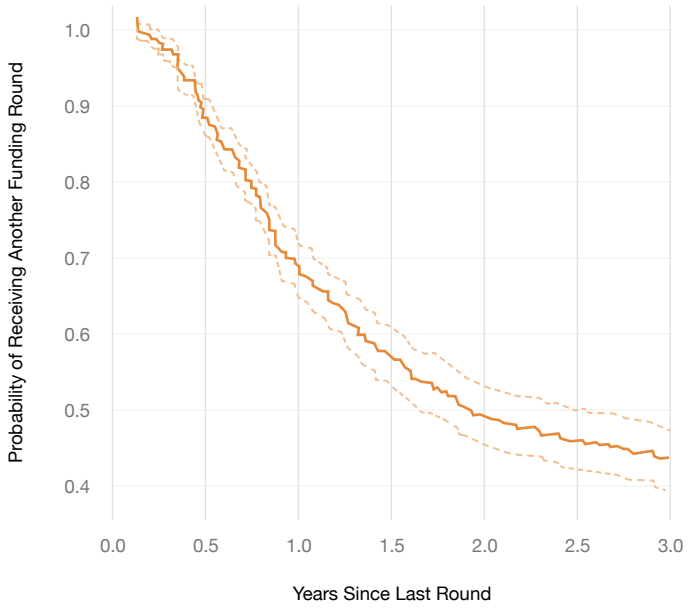


Figure 6

Probability of Follow-On Investment by Time Since Last Investment



The Startup Response:

Navigating the Valley of Death in PA

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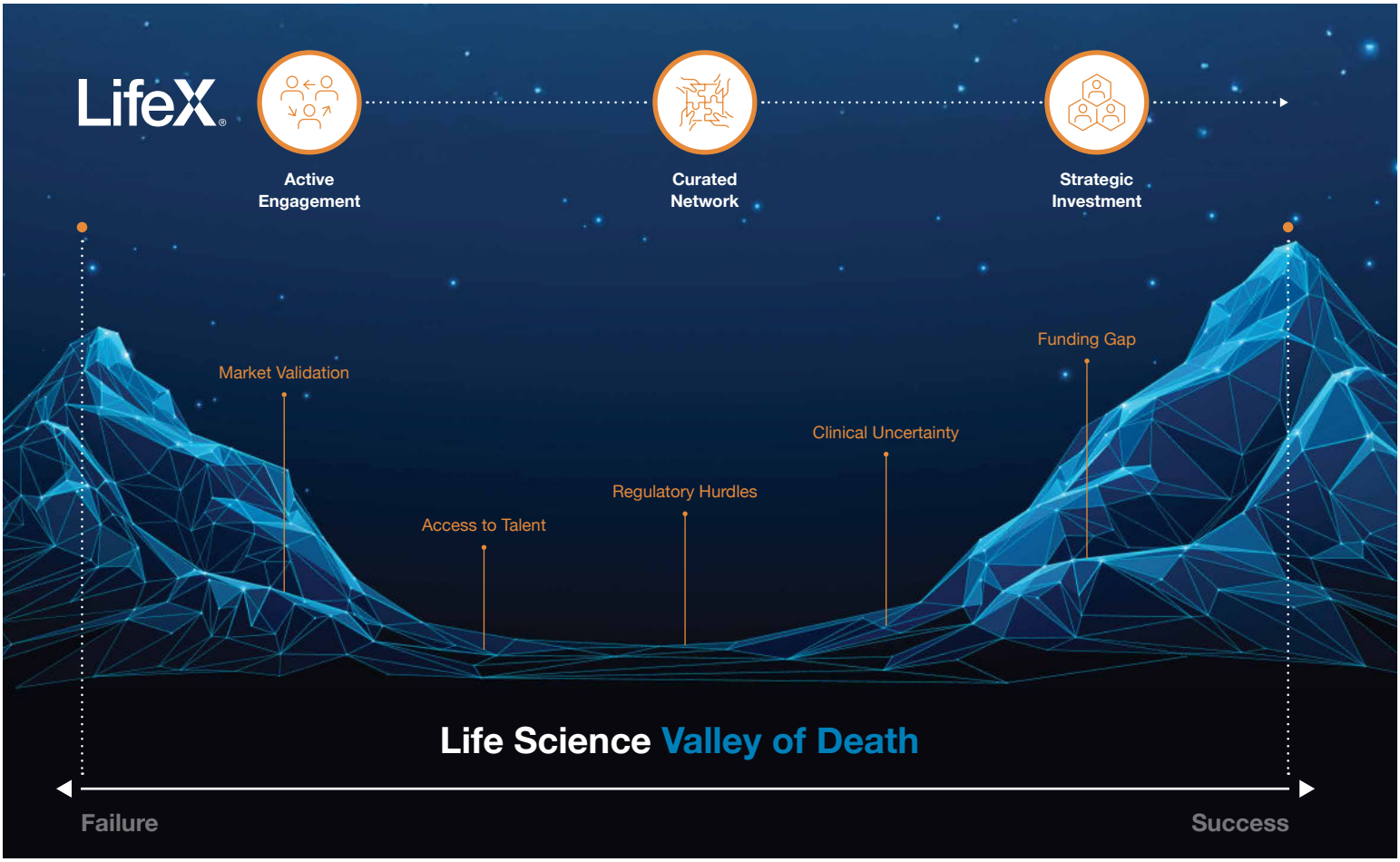
Figure 7



This has created a growing constraint on early-stage innovation centers in regions such as Pennsylvania, where high value technologies continue to lead to strong numbers of company formation and the growing need for experienced talent and early-stage higher risk investment capital. Crucially, investors are steering capital toward later-stage companies that have already reached clinical development and demonstrated market readiness. As a result, early-stage, pre-clinical ventures are finding it harder to raise funding in an environment that demands more validation and less risk.

A highly specialized blend of human resources, funding, and domain expertise is essential for life science startups to succeed. Limited access to these critical items, however, remains the primary reason why 90% of life science startups fail to cross the "valley of death."[5] If a structured approach across this gap for early-stage life sciences companies existed providing experienced leadership, critical infrastructure, industry networks and seed capital, risk would be substantially mitigated and the drive to commercialization would be accelerated.

The life science industry is faced with an unprecedented change in the fundamental landscape of innovation development. Companies are requiring capital infusions along with strict milestone criteria to survive.

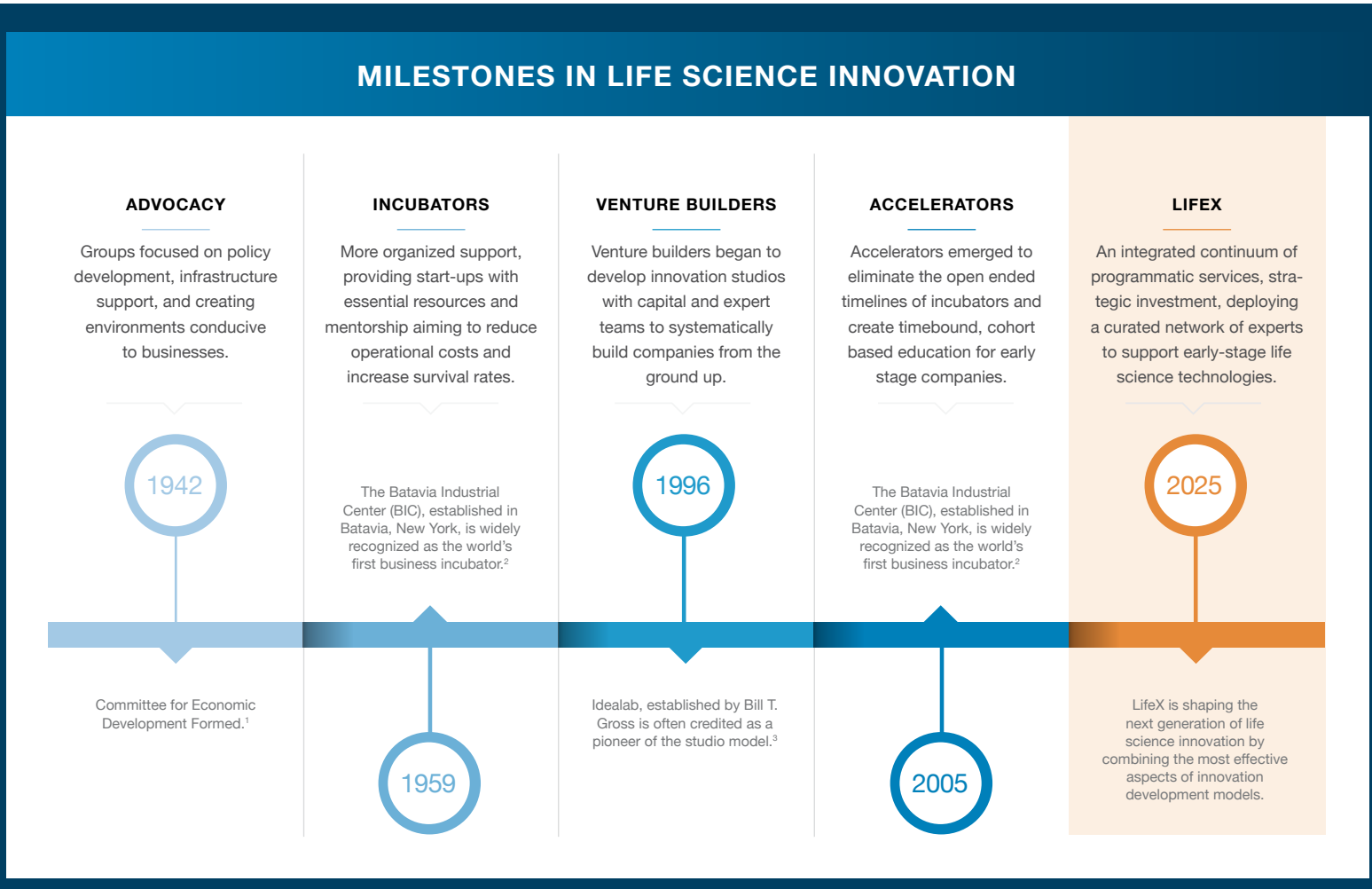
[5] Howarth, J. (2023, November 3). Startup failure rate statistics (2024). Exploding Topics. Retrieved from https://explodingtopics.com/blog/startup-failure-stats

A New Model for Success:
The LifeX Platform Solution

To keep pace with rapid advancements in life science discovery, models advancing the development of startups based on these world-impacting innovations must evolve.

The shift from traditional advocacy groups and incubators to venture studios and accelerators has helped propel startups towards success (Figure 8). However, funding constraints across the life science landscape and the various support structures put in place for regional economic development continue to blunt the trajectory of early-stage companies. These startups must find a way to operate with greater capital efficiency while simultaneously accelerating towards clinical and commercial validation. The survival of early-stage life science startups relies on continuous capital and expert guidance, yet many struggle to secure follow-on funding, with median times between venture deals continually increasing a gap LifeX's model addresses.

Figure 8



1. Breznitz, S.M, & Kenney, M. (2017). Regional technology-based economic development. Policies and impacts in the U.S. and other economics. Now Publishers.
2. Peters, J. (2017, June 28) How a 1950s egg farm hatched the modern startup incubator. Wired. Retrieved from https://www.wired.com/2017/06/how-a-1950s-egg-farm-hatched-the-modern-startup-incubator/
3. Idealab. (n.d.). 25 lessons in 25 years. Retrieved from https://25-lessons.idealab.com/introduction/
4. Y Combinator. (n.d.). About Y Combinator. Retrieved from https://www.ycombinator.com

The Entire Package:

How the LifeX Continuum Alters Outcomes

LifeX®, a Pittsburgh-based organization, founded in 2017, that also serves as the Life Science Greenhouse for Western PA, is at the forefront of cultivating the next generation of life science companies.

Through its broad-based continuum model, LifeX integrates programmatic support, strategic investment, and a scalable framework to drive early-stage life science innovation from concept to commercialization. In so doing, LifeX is helping to change the course of the bioeconomy in Pennsylvania.

LifeX is uniquely positioned to strengthen SW Pennsylvania's life sciences sector by providing programmatic support, strategic investment, and a scalable framework for early-stage companies. By integrating leadership talent, domain expertise, and capital, LifeX fills critical gaps that have historically hindered startup success, not only in its region but across the Commonwealth and the country.

Through its comprehensive support approach, LifeX de-risks startups and accelerates their path toward delivering impactful solutions with meaningful outcomes and sustainable commercial success. By fostering growth of these companies and eliminating barriers to market entry, LifeX is strengthening Pennsylvania's position as a leader in life science innovation, fueling long-term economic growth.

By merging hands-on leadership, investment capital, and domain-specific expertise, the LifeX model provides startups with comprehensive support at every stage of development.

The LifeX Accelerator™ prepares early-stage companies for commercial readiness by offering specialized curricula, well-connected domain experts, and strategic mentorship. Companies that have reached foundational commercial readiness can transition to the LifeX Launchpad™, which provides funding and access to experts in regulatory, reimbursement, clinical economics, commercialization, and capital strategies.

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Figure 9

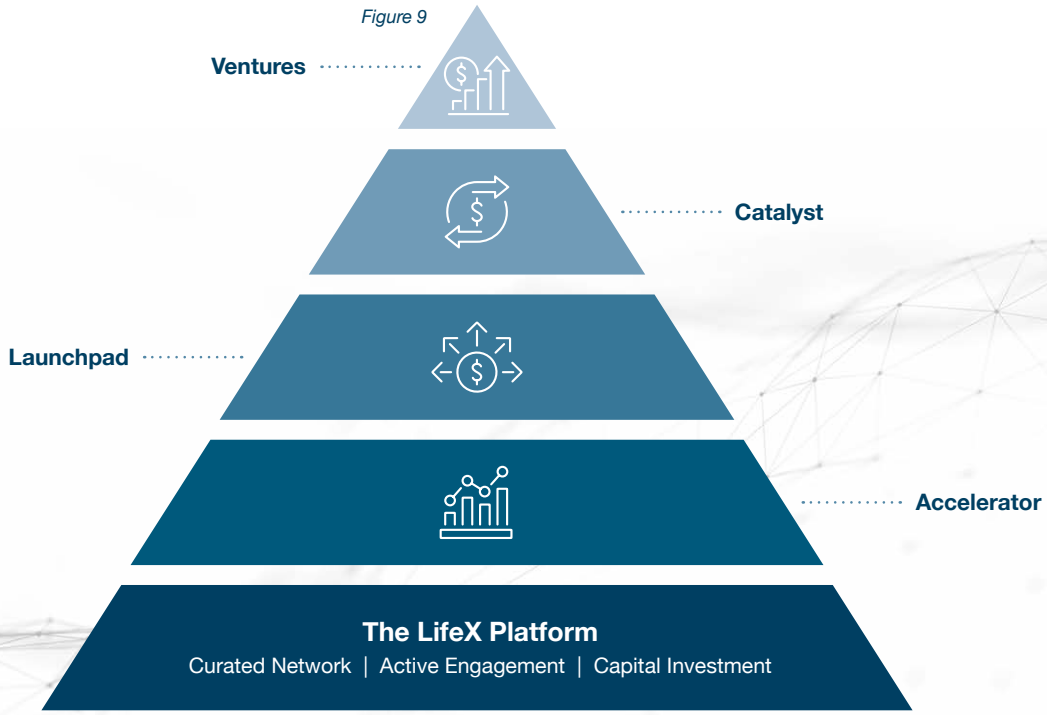
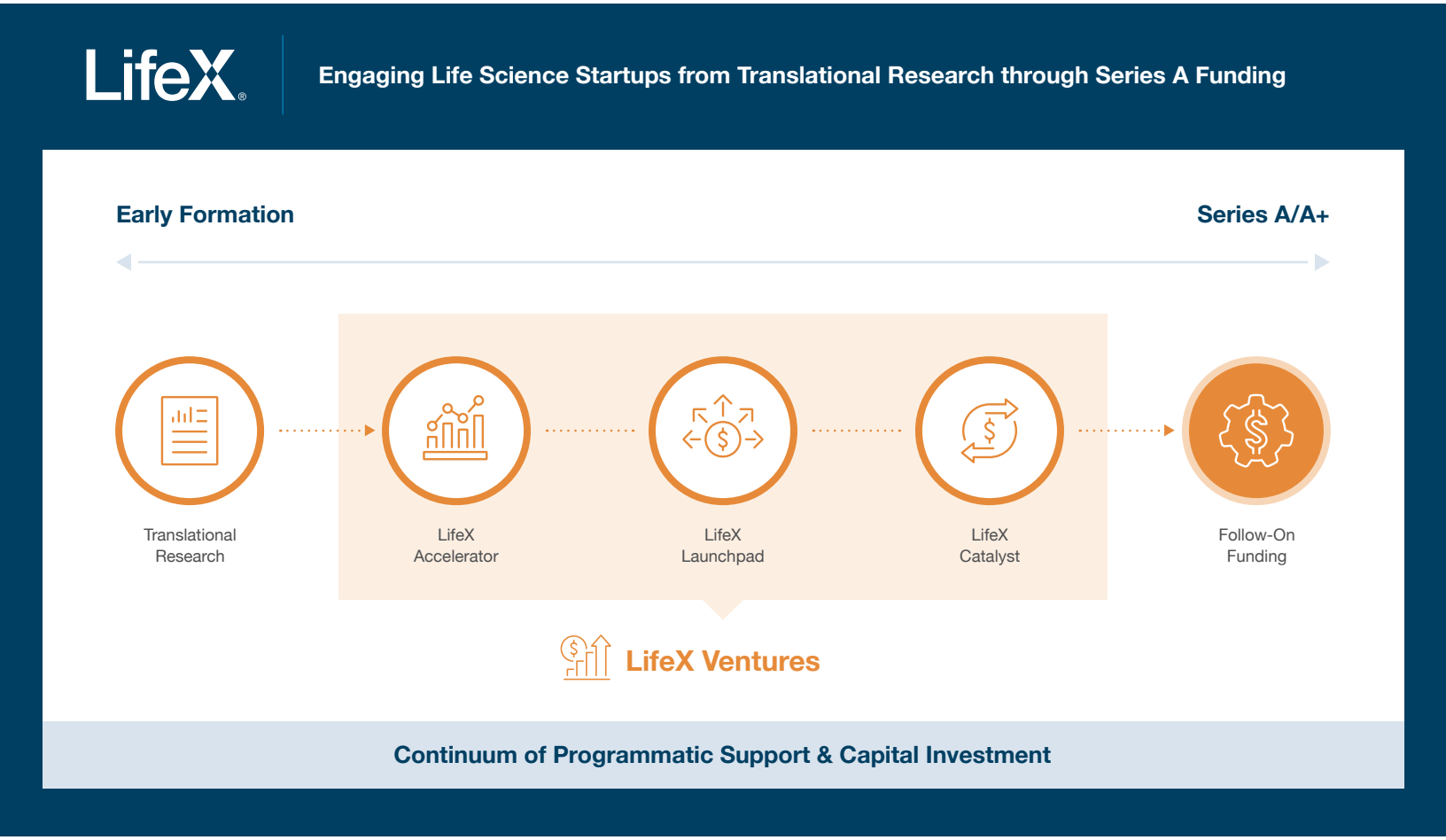


Figure 10



The Entire Package:

How the LifeX Continuum Alters Outcomes

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Recognizing that many early-stage startups struggle without experienced executive leadership, the LifeX Catalyst™ was created to address this gap. This element injects operational engagement as well as pre-seed investment capital to accelerate key milestones, increase executional success, and improve a startup's ability to attract venture capital. By leveraging this extensive continuum of offerings, LifeX Ventures™ continuously creates deal flow of de-risked companies and can prioritize candidates for investment, ensuring that the most promising opportunities receive the strategic support necessary for commercialization.

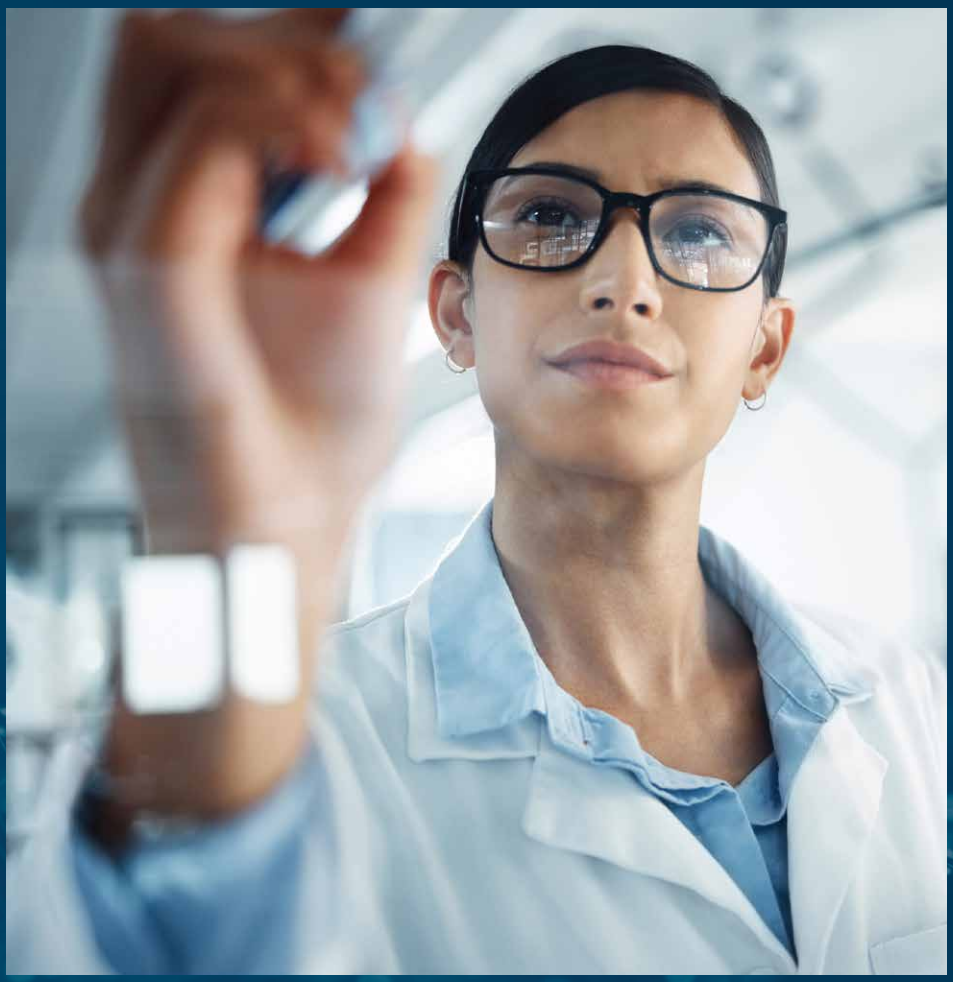
The LifeX continuum is built on a foundation of core elements-active engagement, expert support and capital investment-which scales through a layered model (Figures 9 & 10): cohort-based programming in the Accelerator, project-based funding in Launchpad, hands-on leadership and investment through Catalyst, and venture-stage capital via LifeX Ventures.

Since 2020, LifeX has supported more than 75 early-stage companies, with 25% of Accelerator participants securing follow-on funding. Through the pilot phase of the Continuum launch, LifeX has helped advance several portfolio companies from early concept to venture investment by providing active engagement, expert network access, and targeted capital support.

Conclusion

The early-stage life science investment landscape is shifting, with capital increasingly concentrated on lower-risk, later-stage companies.

This trend has made it harder for early-stage ventures, especially in regions like Pennsylvania, to secure the expertise and funding needed to reach critical milestones. LifeX's continuum-based platform is designed to address this gap, advancing startups from concept to commercialization with targeted support, expert networks, and strategic investment. To fully unlock Pennsylvania's life science potential, the ecosystem must align around strengthening early-stage development and LifeX is ready to lead that effort.



About LifeX

LifeX is a Pittsburgh-based life sciences commercialization platform, founded in 2017, that serves as the official Life Science Greenhouse for Western Pennsylvania. Through its integrated suite of programs, Accelerator, Launchpad, and Catalyst, LifeX provides expert guidance, hands-on leadership, strategic funding, and ecosystem connections. LifeX Ventures serves as the investment arm, providing pre-seed and seed capital alongside executive-led initiatives to help startups navigate critical inflection points. Together, these programs empower life science innovators to transform scientific breakthroughs into patient-ready solutions.

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