Baltimore Together.

A Platform for Inclusive Prosperity

Advancing Life Sciences in Baltimore City: Supplemental Discussion

A New Vision For Baltimore's Economy

Baltimore Together.

7 Overarching Baltimore Together Goals

Build an equitable economy.
Objective: Eliminate economic racial disparities.

Be world-class leaders in key industry sectors.
Objective: Lead in life sciences, logistics, digital services, medical devices, social enterprise and creative industries.

Build a thriving innovation and small business ecosystem.
Objective: Increase job growth and investment in businesses under 500 people.

Build a stronger workforce system.
Objective: Ensure residents have career opportunities at a living wage.

Grow the city's population.
Objective: Create a more equitable tax base.

Support equitable neighborhood development.
Objective: Increase investment in formerly redlined communities.

Recover stronger from COVID-19.
Objective: Rebuild and grow negatively impacted sectors.

4 Key Baltimore Together Strategies

1.

Work Together
Break down barriers, foster collaboration, and increase efficiency.

2.

Invest in People and Places
Create opportunities for residents through strategic investments.

3.

Build from Strength
Leverage Baltimore's assets to strengthen the city's economic future.

4.

Compete to Succeed
Work with partners to address competitive imbalance and address major challenges.

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Advancing Life Sciences in Baltimore City

Baltimore's life sciences draw strength from the city's concentration of researchers, engineers, medical professionals, and manufacturers, who benefit from an entrepreneurial culture that supports the commercialization of scientific discovery from bench to bedside.

Advancing Life Sciences

Baltimore's life sciences sector draws strength from the city's concentration of researchers, engineers, medical professionals, and manufacturers and benefits from an entrepreneurial culture that supports the commercialization of scientific discovery from bench to bedside.

The life sciences sector encompasses:

- Medical technologies, including diagnostics, biomedical devices, and digital health
- Therapeutics, including cell therapies, gene therapies, and biologics
- Manufacturing of vaccines, therapeutics, and devices
- Research and development services
- Academic institutions engaged in research and workforce training
- Healthcare providers

The Innovation Ecosystem

Greater Baltimore's higher education institutions produce and attract talented researchers in the BioHealth Capital region, which encompasses Maryland, the District of Columbia, and Virginia[1]. Scientists based in Baltimore City contribute significantly to the region's strength by conducting groundbreaking research and commercializing these new technologies into startup companies.

Baltimore Together Observations

To capitalize on the city's strengths in this high-growth industry, BDC staff conducted a series of interviews with key professionals in the life sciences in Baltimore City in early 2021. Staff made the following observations:

» Life sciences companies require highly specialized facilities, and the supply of inventory does not currently satisfy demand. This demand will only escalate in the coming years. For Baltimore City to retain these innovative businesses, its life sciences stakeholders will need to find ways to increase the inventory of wet lab space. In other cities, developers have begun to convert existing buildings into labs. To accommodate the real estate needs of this rapidly growing sector, Baltimore's economic developers need to identify properties ripe for conversion to wet lab space and biomanufacturing facilities and present these as business opportunities for real estate developers and investors.

» In addition, life sciences real estate development has historically relied on the anchor tenant model, in which one large tenant commits years in advance to leasing at least 40% of the finished building. This outdated model assumes that the sector consists of well-established

pharmaceutical companies rather than lean, innovative startups that characterize it today. For a variety of reasons, startups frequently cannot commit to leases multiple years in advance. In other biotech clusters and within the I-270 corridor, life sciences developers have found ways to build on spec. For Baltimore to achieve the same results, its economic developers should replicate these models. They should capitalize on the expressed interest from institutions, investors, private developers, and property owners to form a public-private partnership that can rehab existing space to wet lab uses.

» Life sciences-related manufacturing creates well-paying jobs that do not necessarily require 4-year college degrees. By fostering the growth of life sciences startups, particularly those with long-term manufacturing needs, the ecosystem can grow the demand for this type of worker. By partnering with area workforce development programs, it can increase the supply.

Baltimore's Location

Baltimore City occupies an advantageous position in the Northeast Corridor, providing transportation infrastructure by land, sea, and air. This serves the needs of manufacturers but also offers researchers proximity to federal regulatory agencies and labs at the National Institutes of Health (NIH) and U.S. Food and Drug Administration (FDA). Despite these geographic strengths, the cost of renting lab space remains far lower here than in several other life sciences hubs; in addition,

> "I couldn't unhear it. I couldn't unsee it. I felt a responsibility to do this work because if you have the ability to change even one life, then you need to do everything you can to do so."

Ellington West
Sonavi Labs

Ellington West, CEO of Sonavi Labs, is developing technology commercialized from the Johns Hopkins Whiting School of Engineering. The noise-canceling stethoscope device the firm created will reduce child deaths stemming from pneumonia. In the past two years, Sonavi Labs graduated from the Emerging Technology Center's Accelerate Baltimore program, raised a $1 million seed round, won the Arab Health pitch competition, and secured FDA clearance for its Feelix device.

Baltimoreans enjoy a lower cost of living than residents of other Northeast Corridor or Californian cities while benefitting from the cultural amenities of a world-class city.[2]

Maryland vs. Other Life Sciences Clusters

Maryland ranks fifth in market size, fourth in employment, and second in research and development employment among life sciences clusters nationally. Its talent market ranks third (behind only Boston and San Francisco) and its NIH funding ranks third (behind only Boston and New York). Maryland-based life sciences companies generate over $18 billion in economic activity annually.[3] Headquartered in Baltimore, Johns Hopkins receives more NIH funding than any other educational or private sector institution.

Baltimore's Strong Talent Pipeline & Pathways to Upward Mobility

Over the past five years, life sciences employment grew to 55,000 Marylanders—an expansion of 9 percent.[4] Montgomery County accounts for 46 percent of life sciences jobs; Baltimore City for 27 percent; and Frederick County for 8 percent.

Maryland boasts the highest number of Ph.D.'s per capita in the country.[5] However, the life sciences sector offers well-paying careers to people with various levels of formal education. Workforce development

> "At Sisu, I do design, development, and early manufacturing of our devices, so my hopes for the future of Baltimore's economy are to see more of that. We're well known for our medical community, but there is an opportunity to grow the business side of healthcare and what we can provide in terms of medical devices, pharmaceuticals, and biotechnology."
>
> Carolyn Yarina and Gillian Henker
> Sisu Global Health

programs make upward mobility possible. One life sciences workforce program, the BioTechnical Institute (BTI) of Maryland, trains prospective lab technicians in wet lab environments while paying stipends, subsidizing transportation, and supporting expungement of criminal records. From 2018 to 2021, 51 percent of BTI's students were on public assistance; 77 percent were women; 31 percent were single parents; 95 percent were African American; and 40 percent were unemployed.

Upon graduation from BTI, newly minted lab technicians have secured jobs with over 25 companies and institutions; crucially, many well-paying jobs do not require a college degree. In Baltimore City, over 5,000 people currently hold scientific jobs in this sector that do not require a 4-year degree. One of these types of jobs, that of lab technician, made a median hourly wage of $29.77 in Maryland in 2020. BTI coursework counts toward associate degrees at Baltimore City Community College and subsequently toward 4-year degrees from the University of Maryland system – opening additional pathways to success.

Because the life sciences sector provides significant upward mobility, Baltimore's economic and workforce developers should work to grow the companies that hire entry-level lab technicians, expand the existing life sciences workforce programs, and strengthen the long-term science pipeline within Baltimore City. BDC will partner with the Maryland Life Sciences Advisory Board (LSAB), Maryland Tech Council (MTC), and Maryland Department of Commerce. These stakeholders should develop a plan to centralize and standardize training to support the development of the biopharmaceutical workforce (for single or multiple locations). They should develop a unified business case to communicate the benefits of experiential learning for both academe and industry; the need for industry-relevant training for job placement; and the connection between education and career paths.

A taskforce is currently underway spearheaded by LSAB Maryland (Life Sciences Advisory Board) and the Maryland Tech Council, with participation by State of Maryland Commerce.

We should make experiential training the norm rather than the exception. We should also work to generate fierce competition for talent coming through standardized, industry-aligned training programs, with more individuals pursuing training and biotech careers.

Life Sciences and Venture Capital

In the past three years, Maryland's venture capital investments have grown considerably.[6] Baltimore City-based companies account for a disproportionately high share of these dollars. Among the state's jurisdictions, Baltimore City ranks fifth in population but second in life sciences employment. In the first quarter of 2021, companies based in Baltimore brought in over $230 million in venture capital funding —41 percent of the venture capital investments in the state.[7] Life sciences made up the majority of this figure – with cancer diagnostics companies PGDx and Delfi Diagnostics raising a cumulative $203M.[8][9]

Why Wet Labs Constitute a Strong Real Estate Investment

Spurred by growing federal funding, the commercialization of advances in the life sciences has grown rapidly in the past several years. Venture capital has invested heavily in the field, leading to employment growth.

COVID has underscored the importance of this sector. It has also highlighted the industry's logistics and processes. Life scientists rely on in-person work more than their counterparts in most other sectors.[10] This means that as demand for office space has slackened during the pandemic, the demand for wet lab space has grown. Over the past seven years, demand for wet lab space grew 79 percent, according to CBRE.[11] From mid-2020 to mid-2021 alone, CBRE reports that demand has grown by 34 percent across all major markets.[12]

Life sciences real estate has historically performed well, but the cost of development has limited the supply. These conditions existed prior to the outbreak of COVID-19; the pandemic exacerbated the problem. Venture capital and federal funding poured into research and development and manufacturing, and demand for space soared.[13] Meanwhile, commercial real estate development slowed. This has resulted in long waiting lists for available labs.[14] The market has since begun to respond, but strong life sciences economies with severe lab shortages require creative solutions to retain growing companies in the short term.[15]

This shortage of available lab inventory has driven up pricing and rental rates and triggered construction and conversion. Leading life sciences developer Alexandria Real Estate (ARE) doubled its rental revenues 18 months ahead of schedule.[16] In the second quarter of 2021, ARE leased 1.9 million square feet – the company's best quarter for leases in nearly 3 decades in business. [17] In June, CoStar reported that Tishman Speyer had pivoted from a planned traditional office building to a "flex, lab-friendly" property as research and development demand surged. The developer will build this space entirely on spec.[18]

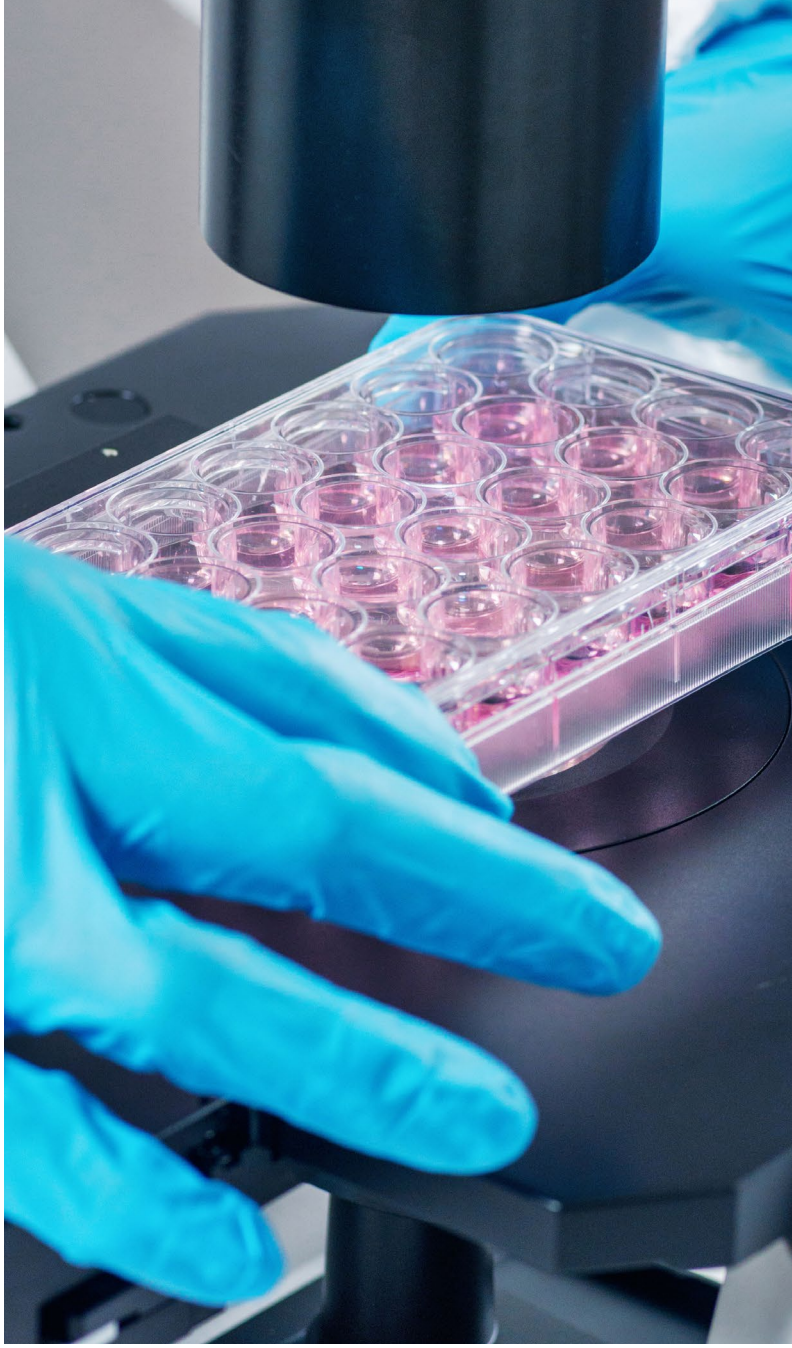
Baltimore suffers from an acute shortage of wet lab space—with a vacancy rate languishing at 1 percent.[19] This poses significant risk to the city's ability to retain the promising startups in its pipeline beyond a certain stage. Baltimore has particular strengths in the life sciences and should build on these to reverse the city's population decline. With the surge in life sciences innovation and investment, the demand for wet lab space will continue to grow. If Baltimore's ecosystem increases the supply of wet labs, it will retain the startups spinning out of Johns Hopkins and the University of Maryland.

Opportunity: Wet Lab Conversion

The conversion of existing buildings into wet lab facilities offers an opportunity to increase the supply of wet lab space, retain growing life sciences companies, and strengthen the city's economy. In Montgomery County, a public-private partnership successfully converted existing space to wet lab use in the city of Gaithersburg, offering an example of how this process works. Conversion can proceed more quickly and more cheaply than new construction; however, this type of adaptive reuse requires considerable infrastructure upgrades compared to

other types of conversion. Lab buildings must protect the safety of tenants and of the surrounding communities and meet planning, zoning, and structural requirements.

The ideal candidate for adaptive reuse and conversion stands no more than 4 stories due to the logistics of renovating the building. This contrasts with the typical new lab building built from the ground up, which typically maximizes density in urban settings by building several stories (as seen at research parks). Buildings with only a few stories can potentially meet the infrastructure limits with fewer changes.[20]



Increasing Wet Lab Inventory

Increasing the city's wet lab inventory will allow Baltimore to retain and expand existing life sciences companies and to attract out-of-market businesses. This will result in enhanced local job creation which will bring new families to Baltimore and simultaneously create pathways to success for existing residents. By strengthening its reputation as an equitable innovation hub, Baltimore will attract more investment.

Recommendations

Baltimore's institutions, companies, and public agencies have the capacity to build on the city's life sciences assets and accelerate the industry's growth.

- BDC and its partners will continue to market the city to life sciences companies, real estate developers, and equity investors around the nation and the globe.
- BDC will form an advisory group of life sciences professionals to advise on the sustainable growth of the sector in the city, focusing on the retention and life sciences companies in Baltimore City and the region, the creation of wet lab space, and the strengthening of workforce development programs.
- In partnership with the Maryland Department of Commerce and the Neighborhood Impact Investment Fund (NIIF), BDC will investigate ways to leverage and underwrite the development of more life sciences-ready real estate.
- In partnership with interested property owners and real estate brokers, BDC

will generate a list of unused or vacant properties in the City suitable for conversion to wet labs. In partnership with the Baltimore City Departments of Planning and Housing and Community Development, BDC will review the zoning, permitting, and use changes needed for this type of project. BDC should serve as a resource to real estate developers, investors, and other stakeholders developing innovative business models for repurposing this space to host a portfolio of life sciences companies.

» In partnership with Maryland Department of Commerce and Maryland Technology Development Corporation (TEDCO), BDC will investigate the incentives available to life sciences companies in other successful innovation hubs and advocate for changes in policy where deemed desirable.

» Develop a plan to centralize and standardize training to support development of the biopharmaceutical workforce (for single or multiple locations).

» Develop unified business case to communicate benefits of experiential learning for both academe and industry (e.g., internships, externships, co-ops, faculty sabbaticals and standards-aligned technical training): need industry-relevant training for job placement; connection between education and career paths, connection between HR/talent acquisition/hiring managers and training organizations.

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Photos of profiled Balitmore business owners and residents are courtesy of Jon Bregel.

Jon is a multidisciplinary filmmaker and photographer located in Baltimore, MD. He is also the founder and photographer of BaltimoreSmall.com, a media platform that gives voices to small businesses and nonprofits through photography and storytelling.

Report design courtesy of Points North Studio.

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Building the New Economy in Baltimore

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