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# MassVision2050

Life Science Innovation

December 2025

MASSACHUSETTS  
**HIGHTECHNOLOGYCOUNCIL**

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# Definition of Life Science Innovation

The research, development, and manufacture of pharmaceuticals and medical devices, along with the supporting services and infrastructure for those sectors

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## Sub-sectors included in the analysis:

- Research and development in the physical, engineering, and life sciences (except nanotechnology and biotechnology)
- Medicinal and botanical manufacturing
- Pharmaceutical preparation manufacturing
- Other biological product manufacturing
- Research and development in biotechnology (except nanobiotechnology)
- Testing Laboratories
- Medical laboratories
- In-vitro diagnostic substance manufacturing
- Electromedical apparatus manufacturing
- Analytical laboratory instrument manufacturing
- Irradiation apparatus manufacturing
- Surgical and medical instrument manufacturing
- Surgical appliance and supplies manufacturing
- Dental equipment and supplies manufacturing
- Ophthalmic goods manufacturing

# Executive Summary: Life Sciences

Preliminary

## Macro Trends

- MA is home to the 2<sup>nd</sup> largest Life Sciences workforce in the country with more than 145K employees creating \$53B in GDP (8% of the total US Life Sciences GDP)
- Historically, MA's Life Science Innovation sector has outpaced the state's overall GDP and employment growth as well as the US average
- MA outperformed the US in GDP growth across most major Life Sciences subsectors over the last 10 years, with R&D in Biotechnology, R&D in Life Sciences, and Biological Product Manufacturing experiencing the strongest growth in the state and largest lead over US average
- MA lagged US in GDP growth in select medical device fields (electromedical apparatus, irradiation apparatus) and manufacturing fields (surgical and medical instrument manufacturing, medicinal and botanical manufacturing)
- Looking ahead, life science employment growth is expected to slow over the next ten years, both in MA and nationally. While several subsectors have had employment growth over 5% p.a. in the last decade, none are expected to grow faster than 3.5% p.a. through 2034

## Talent Supply and Demand

- MA institutions are producing sufficient talent to fill many of the top in-demand roles in the Life Science Innovation sector (e.g., general managers, software developers), but demand has outpaced supply for biochemists and biophysicists, industrial engineers, and chemists
- In 2022, MA produced 9K Life Sciences graduates, including 3K from biology programs
- High-demand skills include pharmaceuticals, project management, biology, and biotechnology, though job postings for these skills have declined since 2021
- Technology skills such as artificial intelligence, R programming, and machine learning have seen the fastest growth in job postings since 2021

## Startup and Investment Landscape

- Harvard, BU, and UMass Medical lead academic R&D in MA; Harvard is the only MA school ranked in the national top 10 for Life Sciences R&D
- Life Sciences company R&D in MA grew 31% since 2021, with more than 60% of business R&D focused on pharmaceuticals and medicines
- Life Sciences attracted the most venture capital investment (\$52.6B) in MA from 2020-24 (over 2x the size of the second largest vertical, HealthTech); MA currently has 114 active Life Sciences startups
- Over the past 5 years, there were 173 successful exits by life sciences startups in MA (9 IPOs, 164 M&As)

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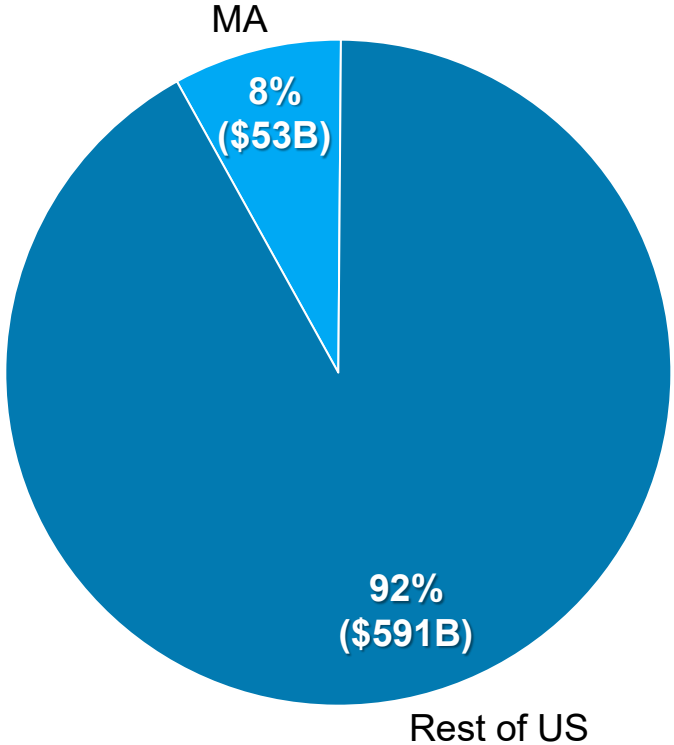
# Objectives for today

- **Macro trends and dynamics**
  - Talent supply and demand
  - Startup and investment landscape

# Massachusetts has the 2<sup>nd</sup> largest life sciences sector in the US and is expected to experience the 2<sup>nd</sup> highest growth over the next 5 years

## Market Size

National Life Science Innovation GDP reached \$643.5B in 2024, with Massachusetts providing an 8% share



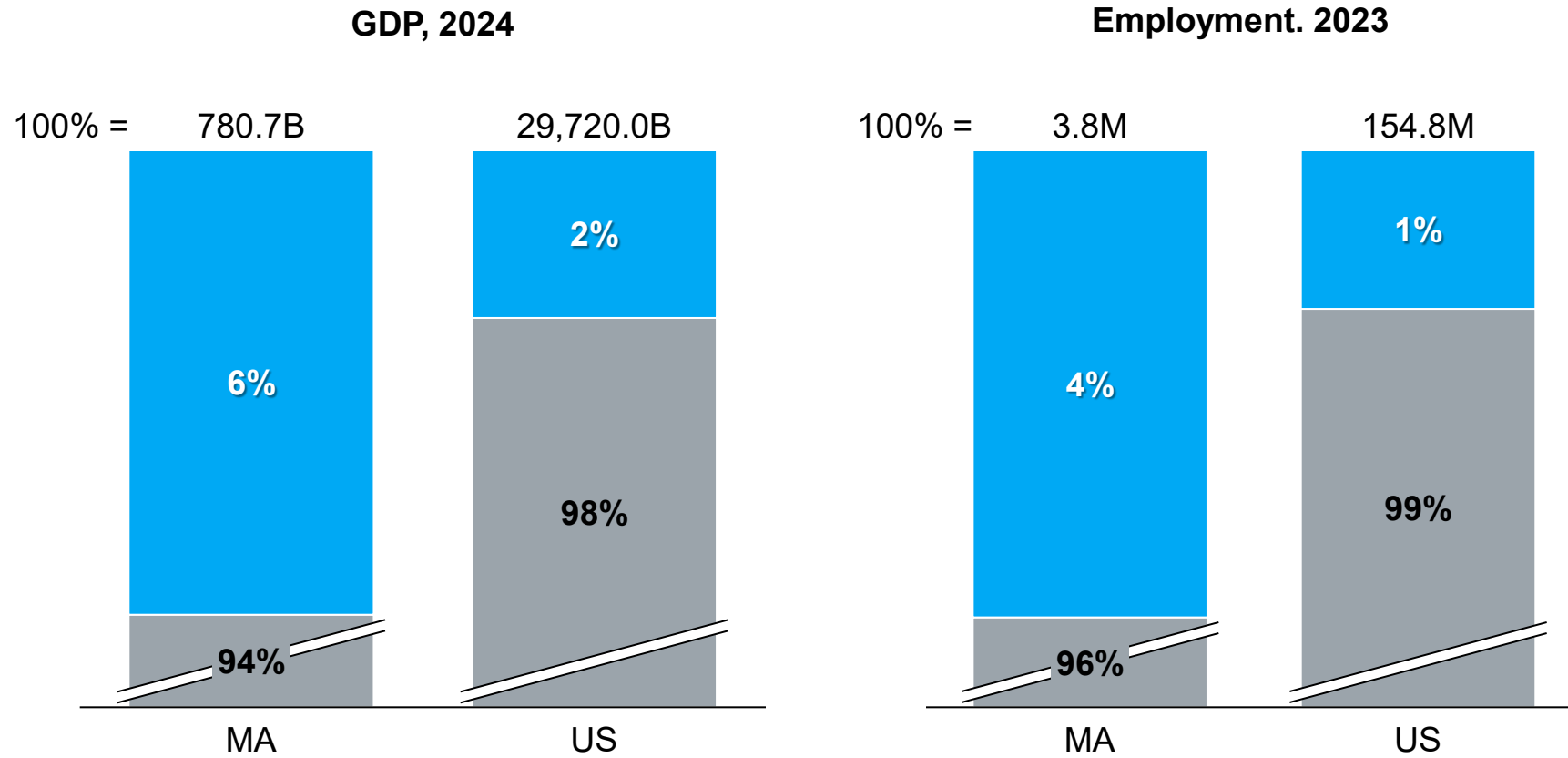
Rank	State	2024 Life Science Innovation workforce, Ths.	Share of workforce, 2024, %	Projected job growth, 2024-2029 CAGR
1	California	353	1.9%	1.2%
<b>2</b>	<b>Massachusetts</b>	<b>145</b>	<b>4.0%</b>	<b>2.1%</b>
3	Texas	110	0.8%	2.3%
4	New York	103	1.1%	1.0%
5	Pennsylvania	99	1.6%	0.7%
6	New Jersey	94	2.2%	0.5%
7	North Carolina	85	1.7%	1.5%
8	Florida	83	0.8%	1.5%
9	Michigan	72	1.6%	0.2%
10	Illinois	70	1.2%	0.4%

# Life Science Innovation accounts for 6% of MA's GDP and 4% of employment, making up a larger share of the local economy than the US overall

Preliminary

Life Science Innovation GDP and employment as share of total economy %

Life sciences innovation Rest of economy



- The share of the MA economy's GDP driven by Life Sciences is ~3x the national average
- The share of the MA economy's employment driven by Life Sciences is ~4x the national average

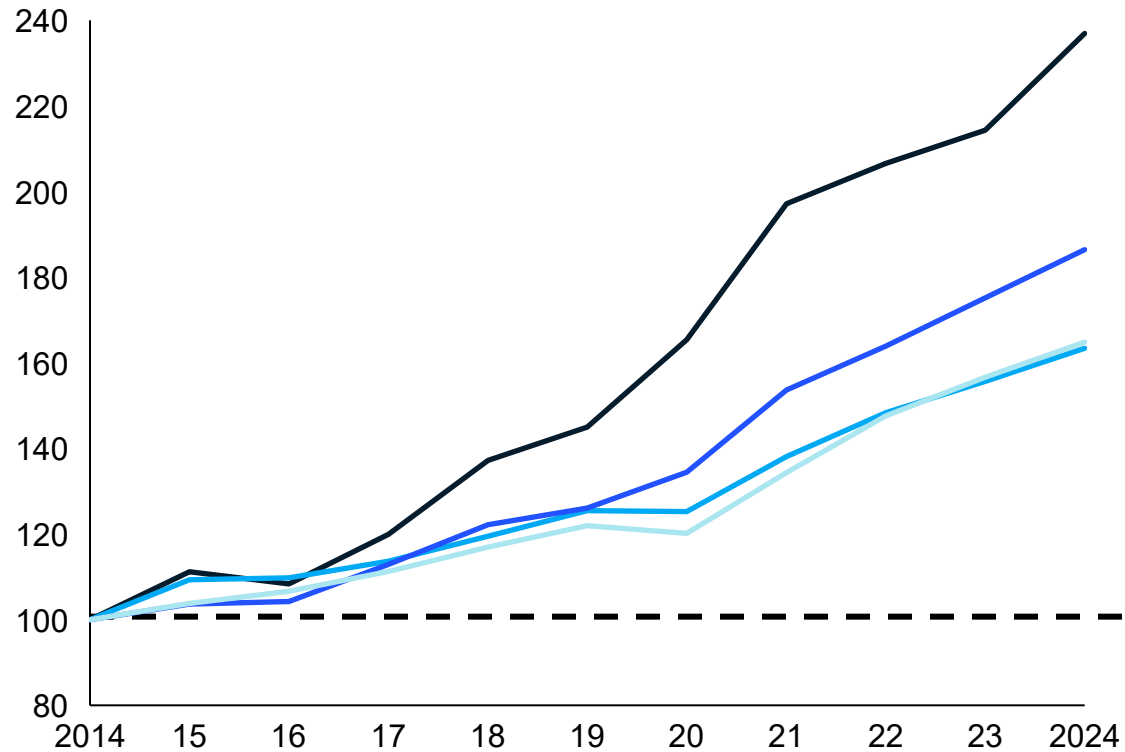
# Historically, MA's life science innovation sector has outpaced the state's overall GDP and employment growth as well as the US average

Preliminary

— MA life sciences innovation — MA total economy — US life sciences innovation — US total economy

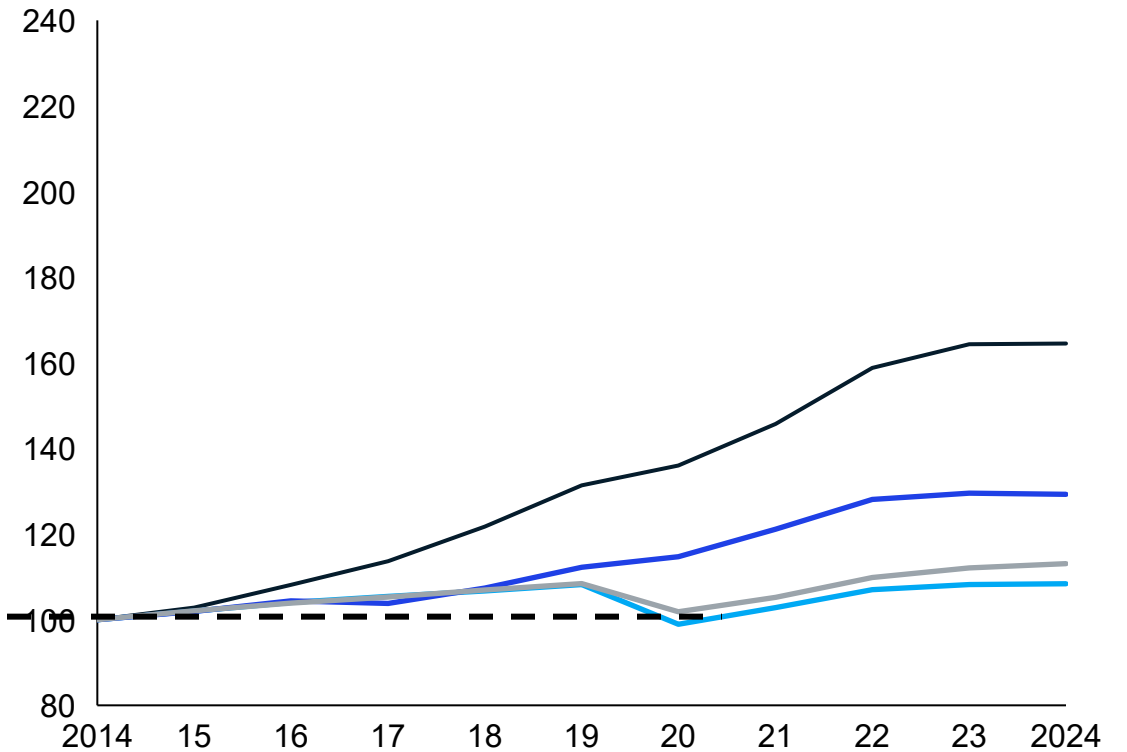
### Life Science Innovation GDP Growth

Indexed to 2014



### Life Science Innovation employment Growth

Indexed to 2014



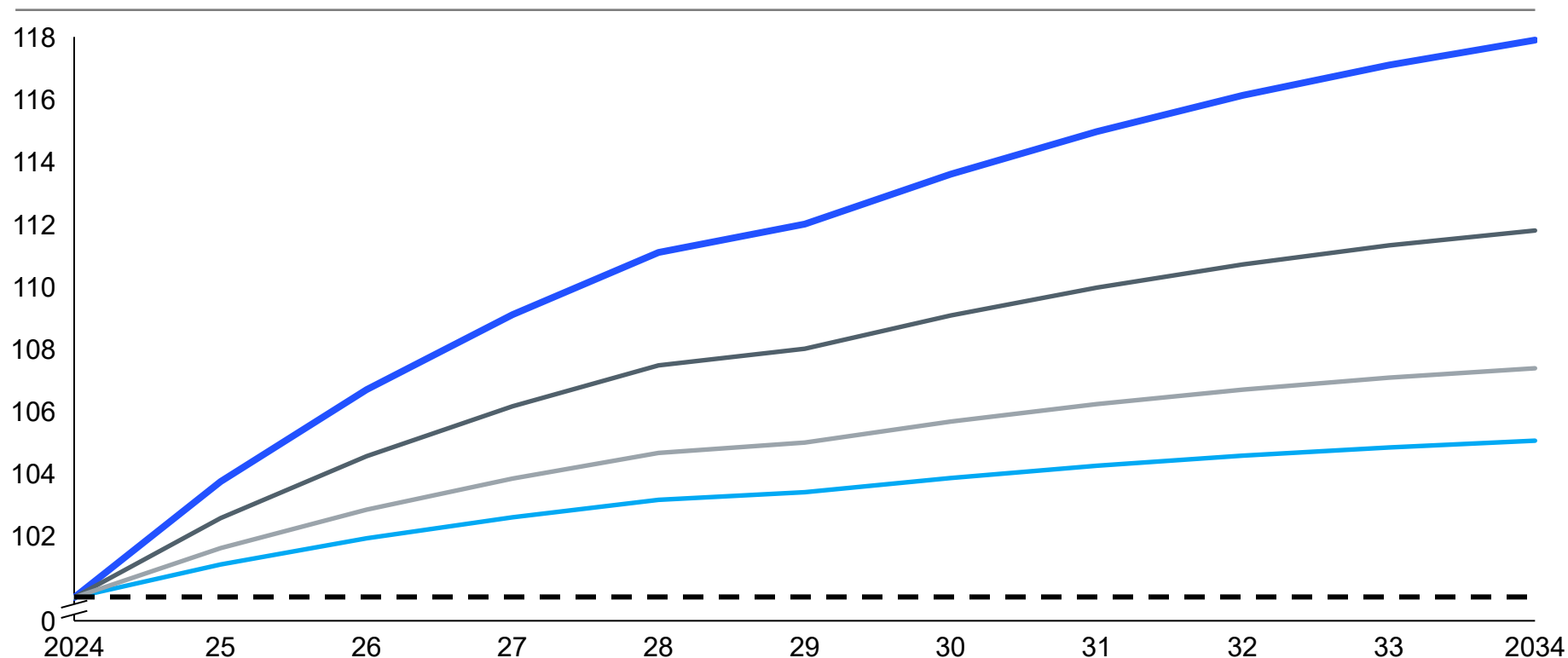
# MA's Life Science Innovation sector employment is expected to continue to grow at a faster rate than the overall state economy and national life sciences cluster

Preliminary

— MA life sciences innovation — MA total economy — US life sciences innovation — US total economy

## Life Science Innovation Employment Growth Forecast

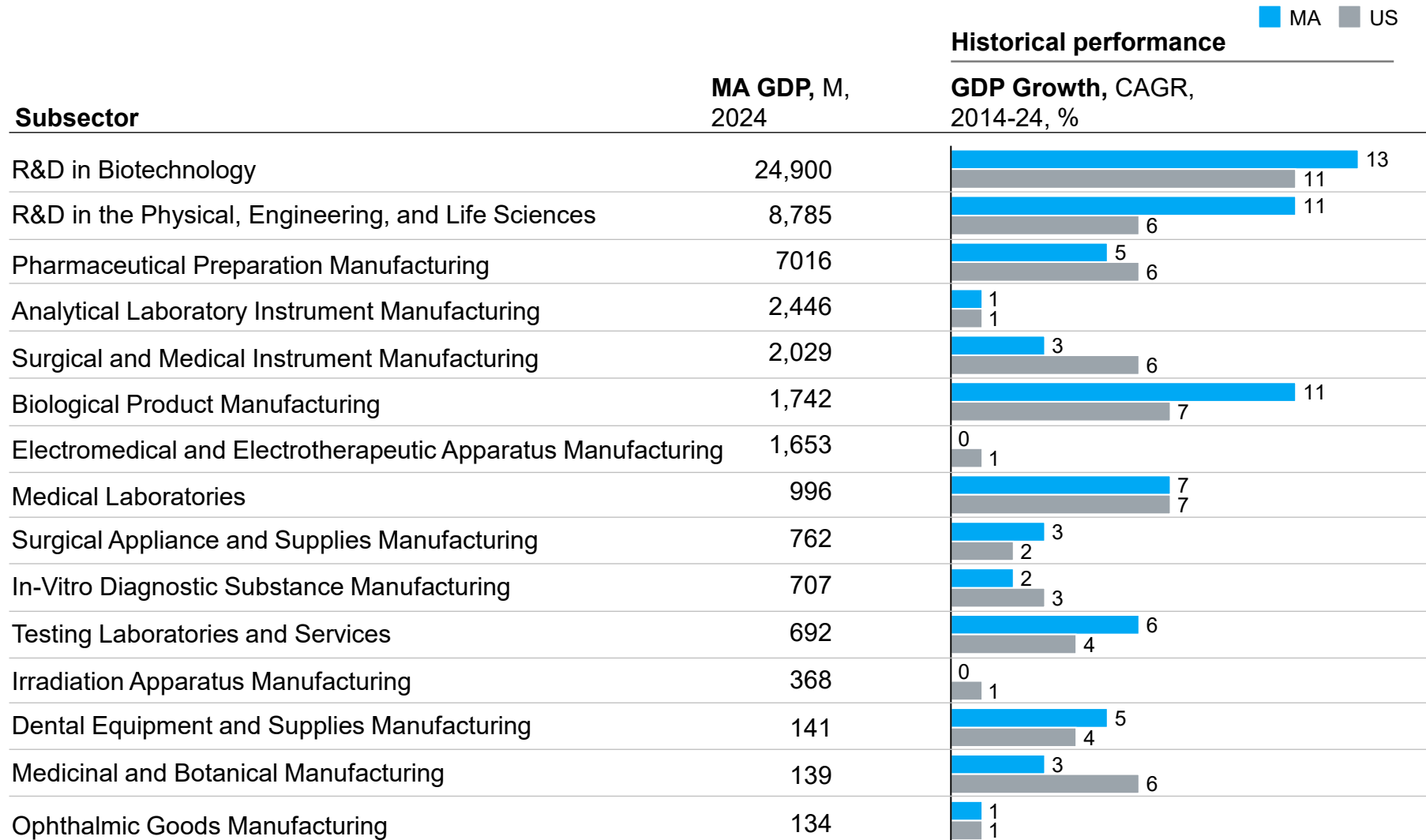
Indexed to 2024



- The Life Science Innovation sector growth is expected to slow over the next 10 years both in MA (4.6% historical vs. 1.5% forecasted 10-year growth rate) and nationally (2.4% historical, vs. 1.0% forecasted 10-year growth rate)

# MA outperformed the US across most major Life Sciences subsectors over the last 10 years

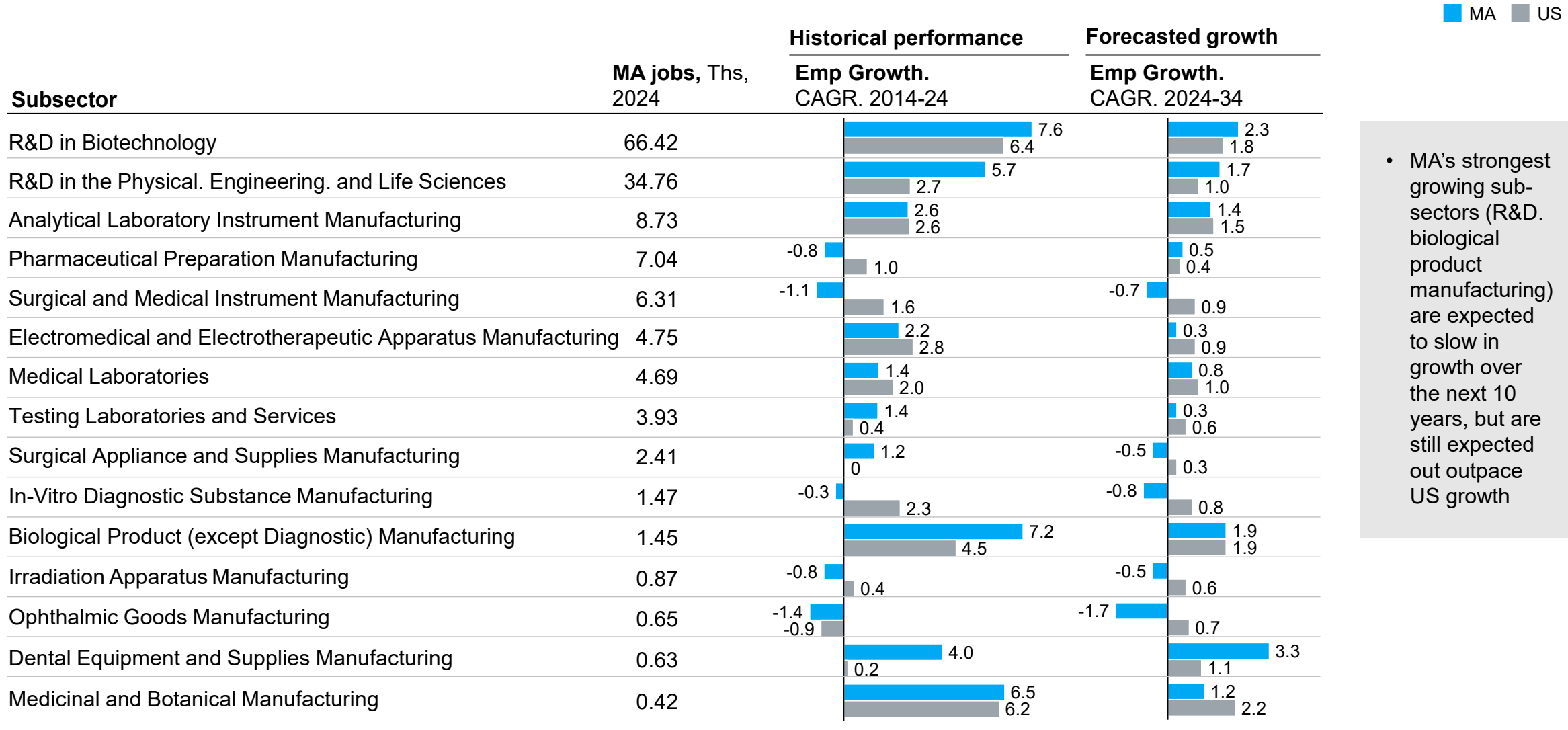
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- Biotechnology R&D and biological product manufacturing subsectors experienced the strongest GDP growth over the past 10 years
- MA lagged in select medical device fields (electromedical apparatus, irradiation apparatus) and manufacturing fields (surgical and medical instrument manufacturing, medicinal and botanical manufacturing)

# While several subsectors have had employment growth over 5% p.a. in the last decade, none are expected to grow faster than 4% p.a. through 2034

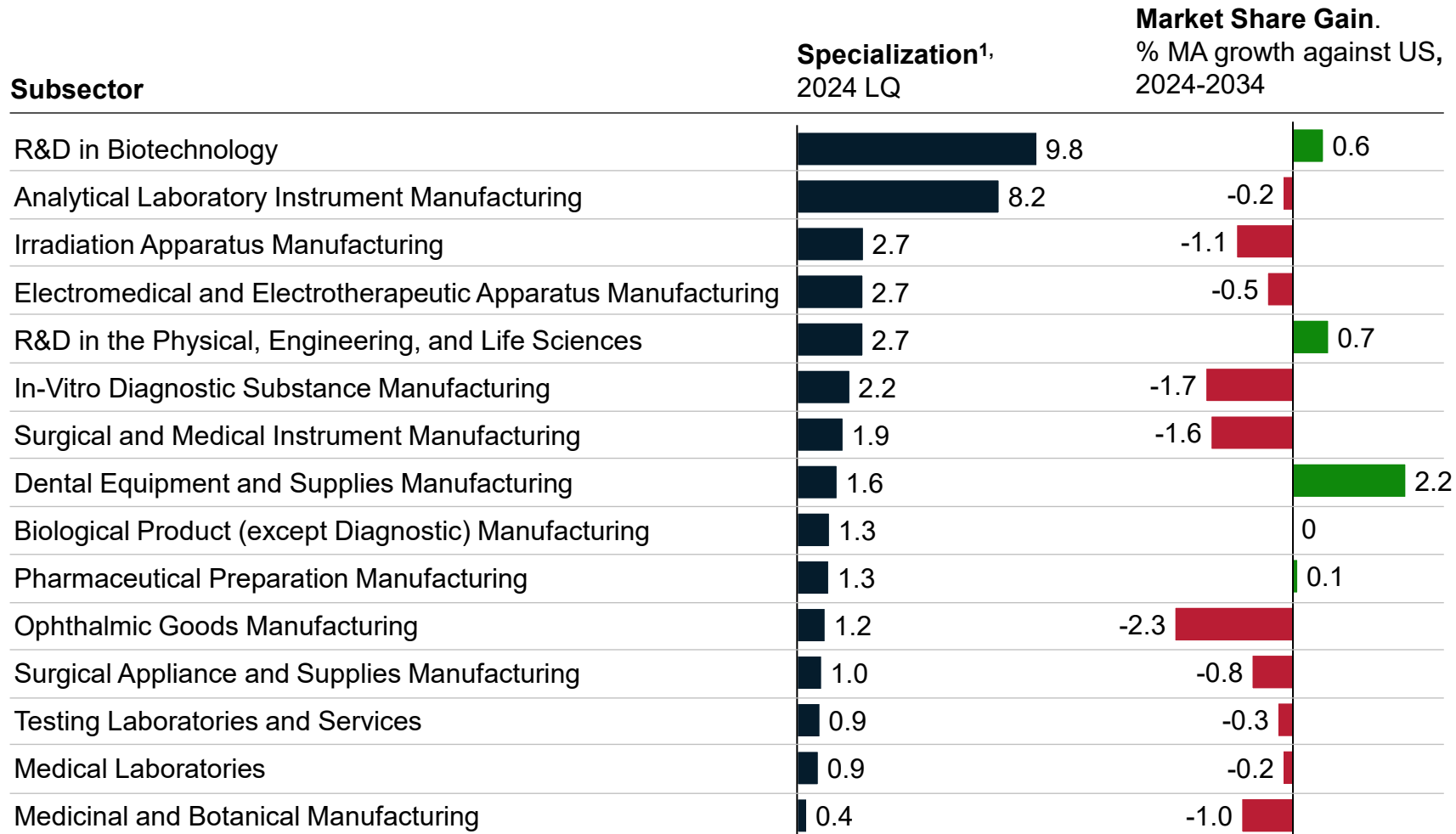
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• MA's strongest growing subsectors (R&D, biological product manufacturing) are expected to slow in growth over the next 10 years, but are still expected to outpace US growth

# MA is expected to gain market share in only 4 out of 15 of its Life Sciences sub-sectors

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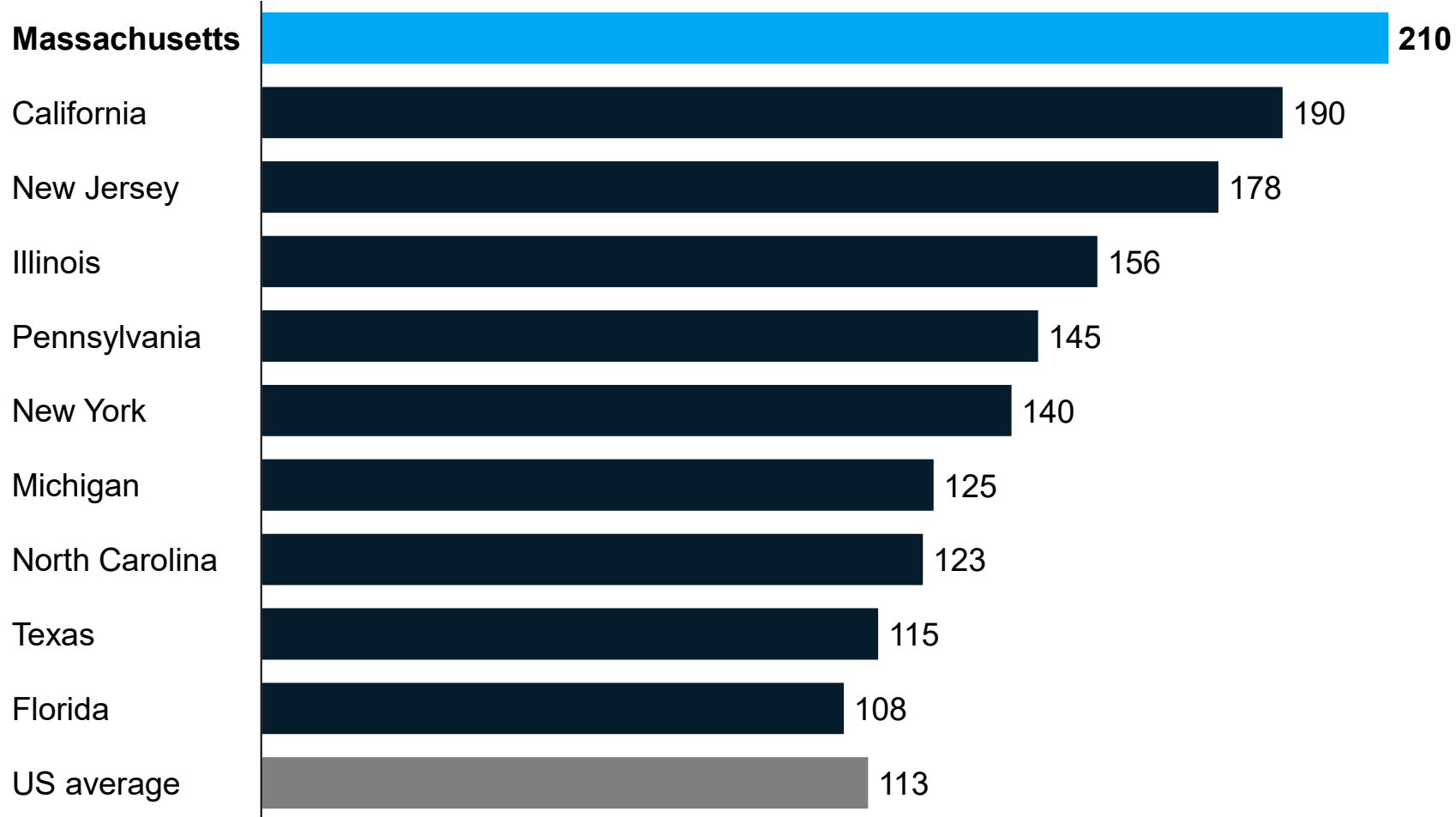


- Over the next 10 years, MA is expected to grow its advantage in life sciences R&D subsectors, but will lose market share against other US states in most of its life sciences manufacturing related-subsectors

1. Specialization (LQ) is measured as the ratio of a sector's share of employment in a region to that sector's share of employment in the US

# Among top 10 states for Life Science Innovation employment, MA has the highest wages within the sector

Life Science Innovation wages by state, 2024, \$K



- MA has higher wages in its Life Science Innovation sector compared to other states with a large Life Science Innovation sector, and the US average
- Subsectors that pay the highest in MA are Biotech R&D, Pharmaceutical Prep Manufacturing, and Biological Product Manufacturing

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# Objectives for today

- Macro trends and dynamics
- **Talent supply and demand**
- Startup and investment landscape

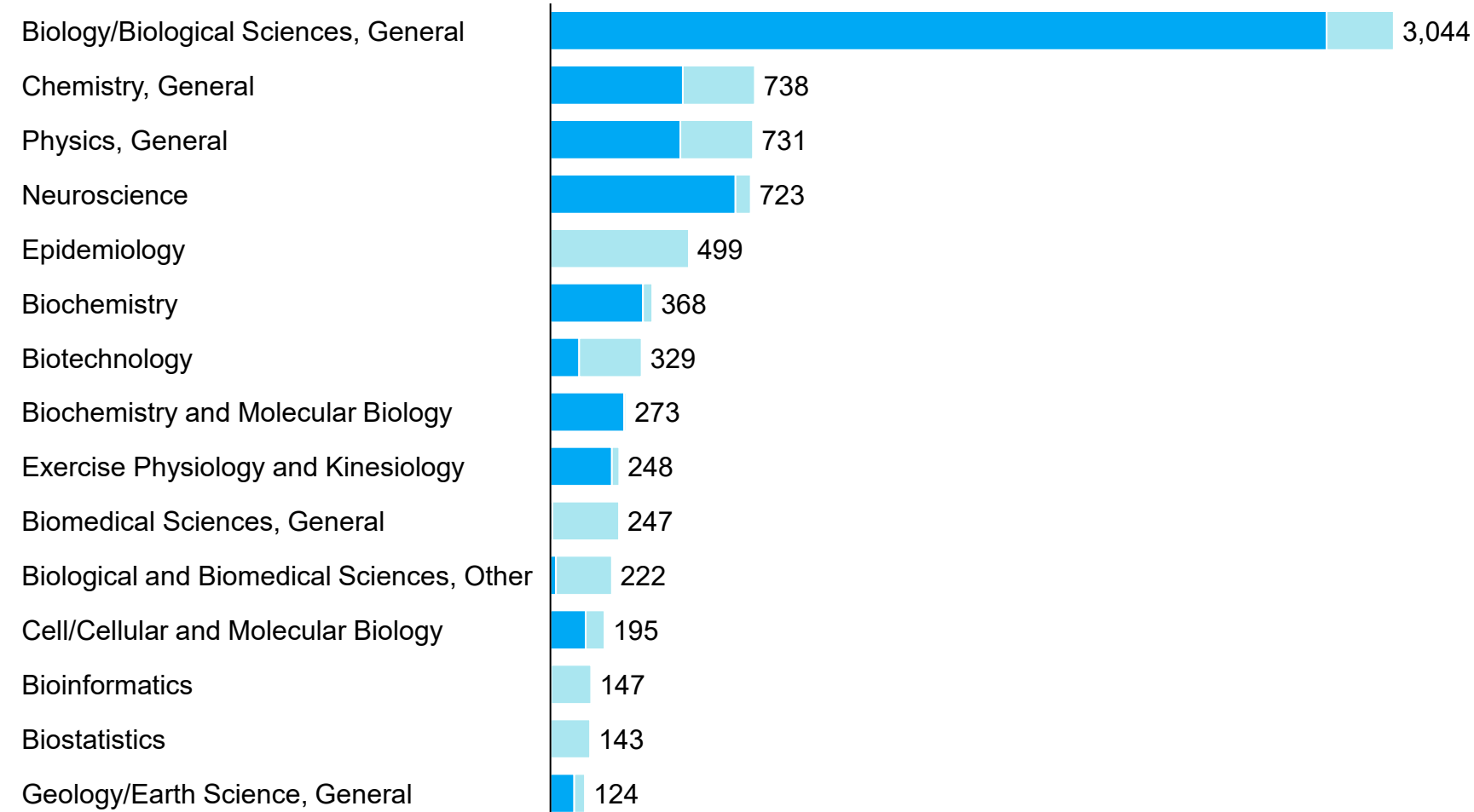
# Massachusetts produced 9K life sciences graduates in 2023, 3K of those graduated from Biology programs

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## Completions in Life Science Innovation programs, MA, 2023

Asc and BA MA and PhD

Top 15 programs within Biological and Biomedical Sciences, Physical Sciences, and Science Technologies, by number of completions



- MA produces 9.2K annual graduates in Life Sciences fields
- ~1/3 of undergraduate degrees in life sciences fields are in biology

# Talent demand has outpaced new supply across many occupations within the Life Science Innovation sector

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## Top occupations within Life Science Innovation sector<sup>1</sup> in MA

■ <50% Completions relative to Openings
 ■ 51-75% Completions relative to Openings
 ■ >75% Completions relative to Openings

Occupations	Job Openings, 2024, K	Completions <sup>2</sup> , 2024	Typical entry level education
General and Operations Managers	9.26	9545	Bachelor's degree
Software Developers	3.82	4663	Bachelor's degree
Computer and Information Systems Managers	2.13	2598	Bachelor's degree
Project Management Specialists	1.71	2020	Bachelor's degree
Biochemists and Biophysicists	1.30	436	Doctoral or professional degree
Medical Scientists, Except Epidemiologists	1.30	902	Doctoral or professional degree
Inspectors, Testers, Sorters, Samplers, and Weighers	1.24		High school diploma or equivalent
Biological Technicians	1.20	616	Bachelor's degree
Electrical, Electronic, and Electromechanical Assemblers	1.18		High school diploma or equivalent
Clinical Laboratory Technologists and Technicians	0.99	646	Bachelor's degree
Natural Sciences Managers	0.94	3817	Bachelor's degree
Industrial Engineers	0.76	208	Bachelor's degree
Mechanical Engineers	0.70	827	Bachelor's degree
Architectural and Engineering Managers	0.63	4413	Bachelor's degree
Electronics Engineers, Except Computer	0.35	468	Bachelor's degree
Chemists	0.34	171	Bachelor's degree
Bioengineers and Biomedical Engineers	0.29	369	Bachelor's degree

- General managers and software developers are in the highest demand in MA's Life Sciences sector
- Most occupations within the sector require a BA or higher, though several production related occupations (inspectors, assemblers) have a lower barrier to entry

1. Based on 2024 employment in industry

2. To adjust for duplication, the number of completions within each degree program (CIP) was distributed to each corresponding occupation (SOC) typically requiring a four-year degree or higher by way of a weighted average based on current employment within occupations

# 3 of the 15 largest public life sciences companies in MA have posted over 1,000 jobs in the past year

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MA's Public life science innovation companies	Revenue, \$M 2024	Job postings, Unique postings, 2024
Thermo Fisher Scientific Inc.	42,879	2 506
Vertex Pharmaceuticals Incorporated	11,020	1 331
Biogen Inc.	9,676	502
Charles River Laboratories International. Inc.	4,050	324
Bruker Corporation	3,366	98
Moderna. Inc	3,236	1 852
Waters Corporation	2,958	392
Revvity. Inc.	2,755	109
Anylam Pharmaceuticals. Inc.	2,248	164
Sarepta Therapeutics, Inc.	1,902	191
Lantheus Holdings, Inc.	1,534	79
Crane NXT. Co.	1,487	0
Haemonetics Corporation	1,309	0
IPG Photonics Corporation	977	337
Novanta Inc.	949	0

## Takeaways:

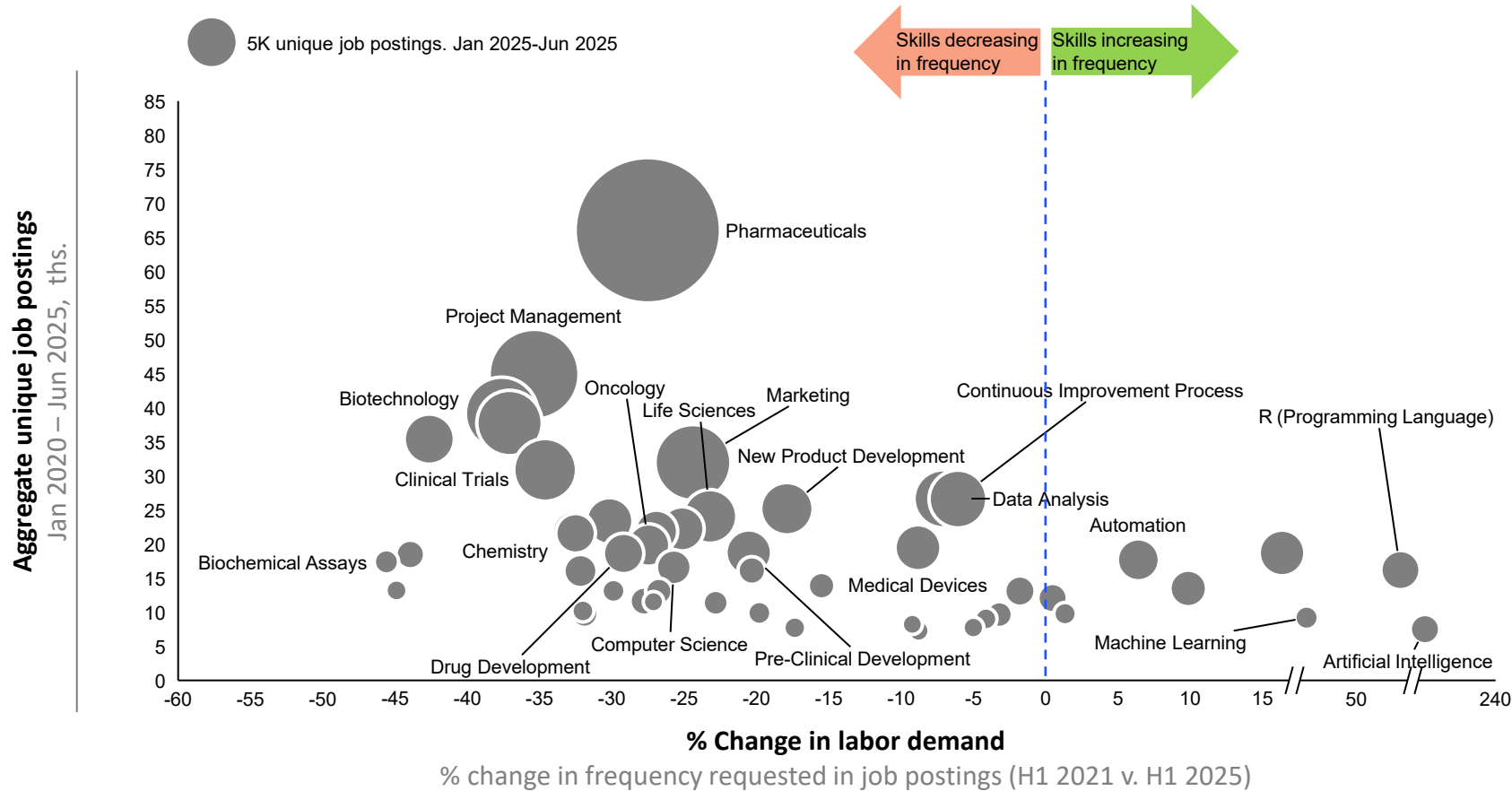
- Thermo Fisher and Moderna have driven the highest volume of postings, with ~2.5k and 1.9K roles, respectively
- 8 out of 15 of the top companies in MA had >200 roles open over the past year

# Top hard skills requested in life science jobs remain concentrated in pharma and biotech, though technology skills are growing in demand

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## Top 50 in-demand hard-skills<sup>1</sup> for MA employers in the Life Science Innovation sector

Jan 2025 – Jun 2025



### Takeaways:

- Artificial Intelligence was the fastest growing skill in job postings since 2021, alongside skills like R programming and machine learning
- Pharmaceuticals, project management, biology, and biotechnology skills have been the most in-demand over the past few years, but postings declined in frequency from 2021.

1. Based on job postings filtered by Life Science Innovation NAICS in MA. Specialized, software, and certificate skills only (excludes common skills).

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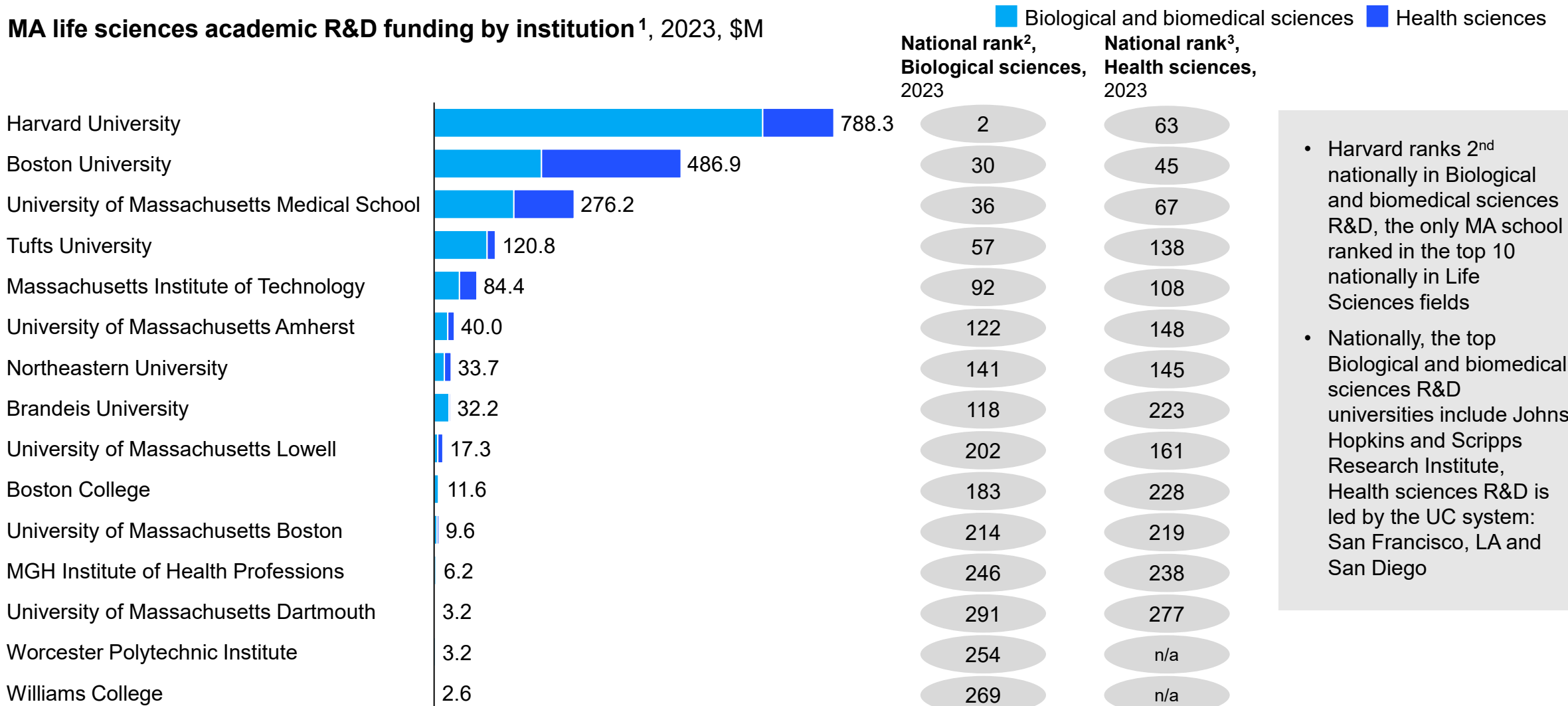
# Objectives for today

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- **Startup and investment landscape**

# Harvard, BU and UMass Medical School lead the state's academic R&D in life sciences

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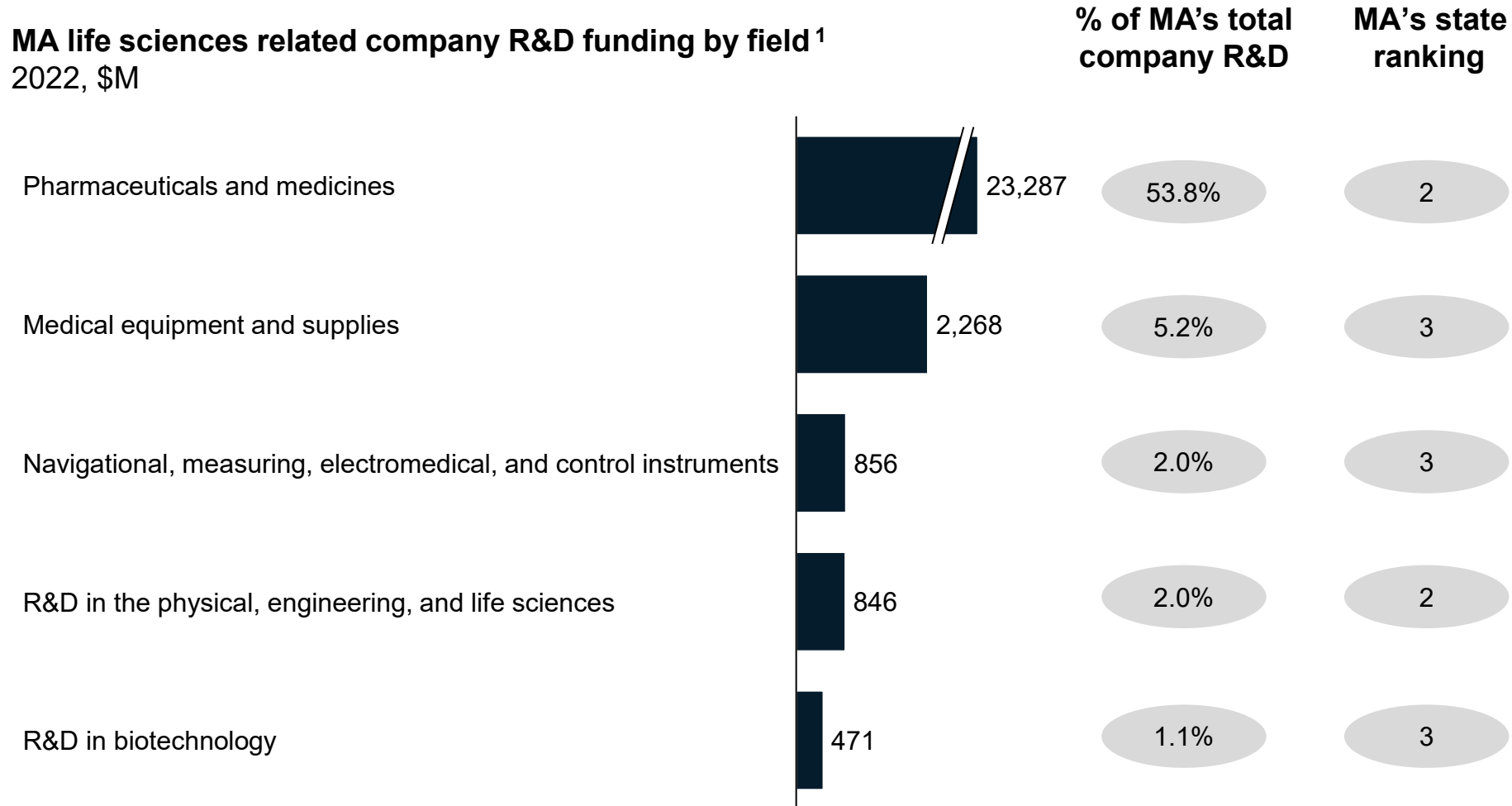
MA life sciences academic R&D funding by institution<sup>1</sup>, 2023, \$M



- Harvard ranks 2<sup>nd</sup> nationally in Biological and biomedical sciences R&D, the only MA school ranked in the top 10 nationally in Life Sciences fields
- Nationally, the top Biological and biomedical sciences R&D universities include Johns Hopkins and Scripps Research Institute, Health sciences R&D is led by the UC system: San Francisco, LA and San Diego

1. Top 15 institutions, based on total funding in both fields; 2., 3. "n/a" where institution has no funding in the field, excluded from ranking

# Over 60% of MA's total business R&D is within the pharmaceuticals and medicines industry



- 64% of company R&D in Massachusetts is within life sciences industries
- Life sciences company R&D increased by 31% since 2021 in Massachusetts (overall company R&D increased by 15%)
- MA is second to California in pharmaceutical industry R&D and behind California and Minnesota in medical devices industry R&D

1. Domestic R&D paid for and performed by the company, based on 6 and 4-digit NAICS codes

# The top deals in Life Sciences over the past 5 years have been mergers & acquisitions

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**~114**

Life Science Innovation startups active<sup>1</sup> in MA

**9**

IPOs in the past 5 years

**164**

M&A exits in the past 5 years

1. Active startups defined as: PE, VC, or accelerator/incubator, or angel backed, privately held business with with business status defined as product development or startup, excluding bankruptcy.

**Preliminary**

## Top 10 exits by Life Science Innovation startups, by valuation, 2020-2024

Company	Exit type	Exit date	Approx. valuation. \$B
Accelaron Pharma	M&A	2021	18.19
Karuna Therapeutics	M&A	2024	13.79
ImmunoGen	M&A	2024	9.20
Cerevel Therapeutics	M&A	2024	8.30
Momenta Pharmaceuticals	M&A	2020	6.10
Nimbus Lakshmi	M&A	2023	5.00
Dicerna Pharmaceuticals	M&A	2021	3.30
Translate Bio	M&A	2021	3.20
Anthos Therapeutics	M&A	2025	3.10
Affinivax	M&A	2022	3.00