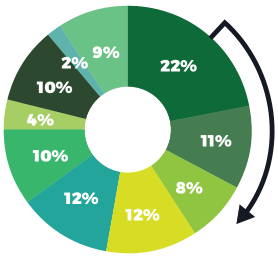
BIOPHARMACEUTICAL SECTOR IMPACT ON MASSACHUSETTS'S ECONOMY

Biopharmaceutical Sector Supported Jobs in Massachusetts

55,704 Direct Sector Jobs + **250,041** Indirect Sector Jobs = **305,745** Total Jobs

Variety of Jobs in Massachusetts's Biopharmaceutical Sector



- Life, Physical and Social Science
- Office and Administrative Support
- Production
- Management
- Architecture and Engineering
- Business and Financial Operations
- Sales and Related
- Computer and Mathematical
- Transportation and Material Moving
- Other*

Biopharmaceutical Sector's Contribution to Massachusetts's Economy

ECONOMIC OUTPUT

$79.2B

Total Value of Goods and Services Supported by Biopharmaceutical Sector

REVENUE GENERATED

$6.2B

Total State and Federal Taxes Paid

EMPLOYEE PRODUCTIVITY

$567,003

Per Employee in Direct Biopharmaceutical Sector Jobs

vs

$178,739

Per Employee Across All Massachusetts Job Sectors

AVERAGE COMPENSATION

$156,027

Per Employee in Direct Jobs in the Biopharmaceutical Sector

vs

$71,883

Per Employee Across All Massachusetts Jobs

**Other occupations include areas such as Installation, Maintenance, & Repair, Healthcare Practitioners, Arts, Design, & Media, and Building & Grounds Maintenance, among others.*

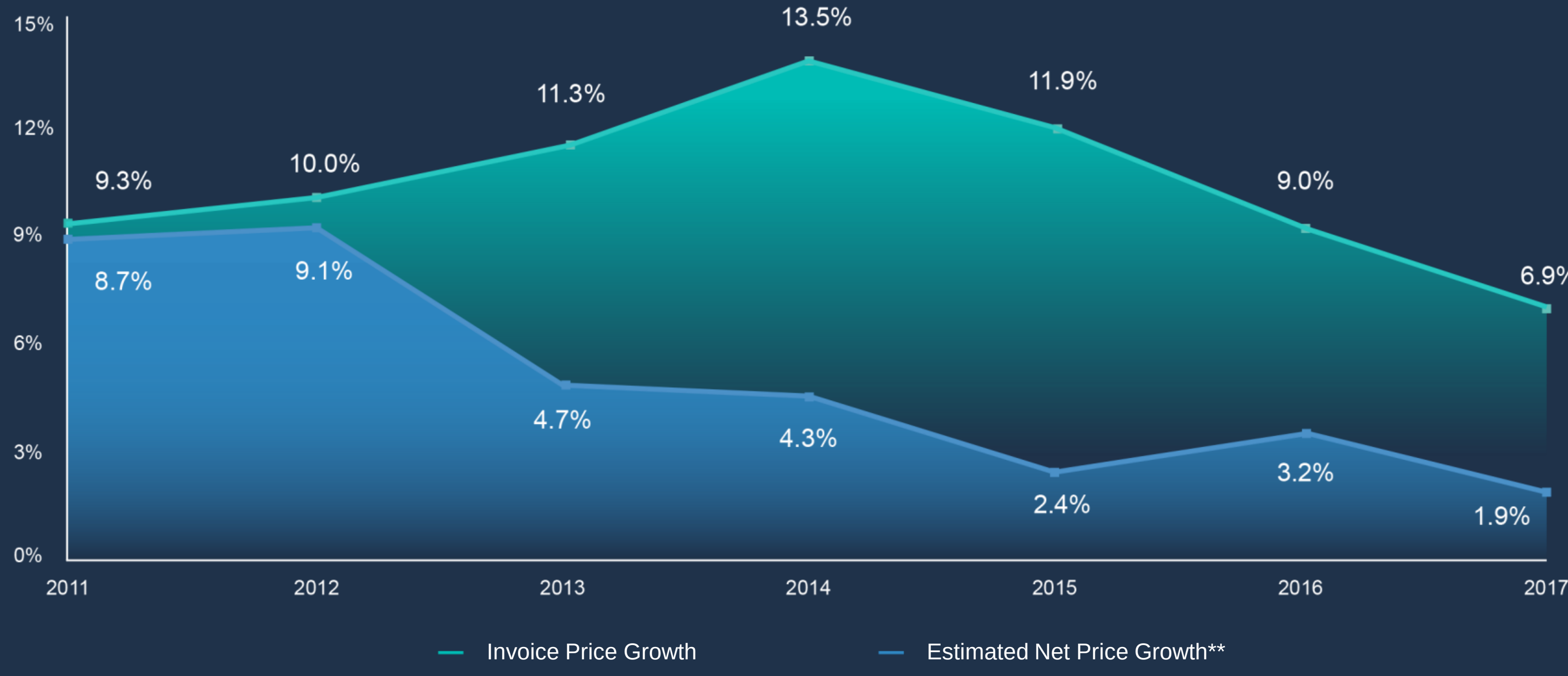
Source: TEConomy Partners, The Economic Impact of the Biopharmaceutical Industry: U.S. and State Estimates. Report prepared for PhRMA in November 2017 and reflects 2015 data.

In the midst of incredible progress, medicine cost growth is declining.

EXPRESS SCRIPTS®	CVSHealth®	IMS Health & Quintiles are now IQVIA™
3.8%	3.2%	3.9%
2016	2016	2016
1.5%	1.9%	0.6
2017	2017	2017

Note: IQVIA data is reflective of retail and physician-administered medicine spending.

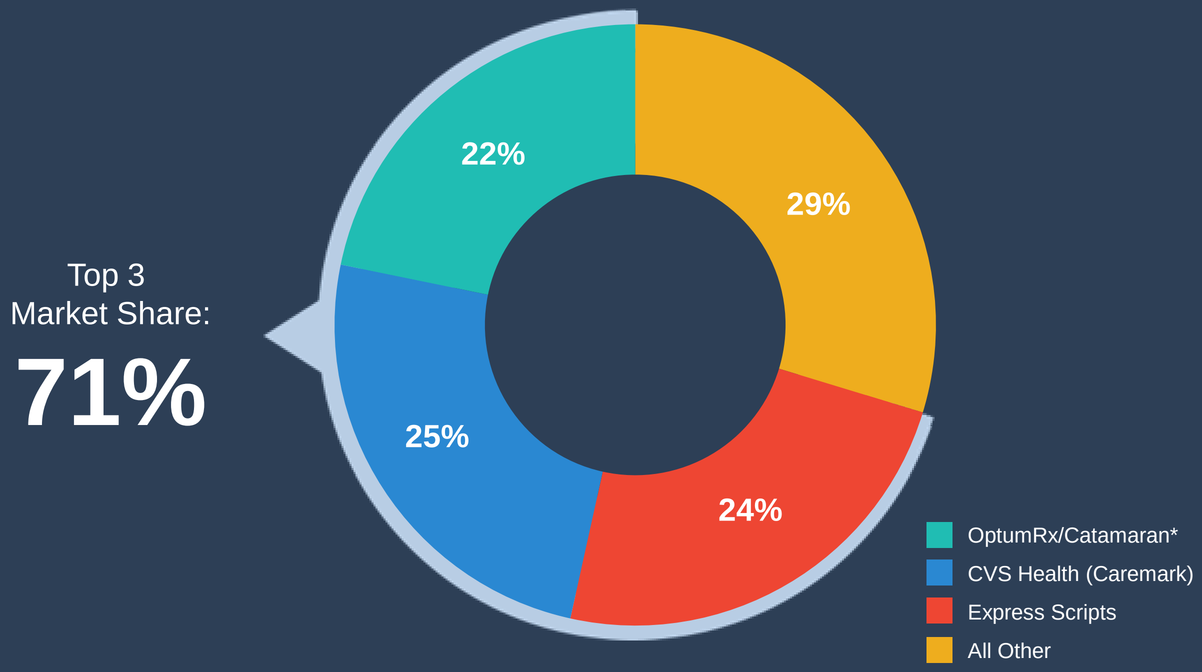
In fact, after discounts and rebates, brand medicine prices grew just 1.9% in 2017.



Source: IQVIA. Medicines use and spending in the U.S.: a review of 2017 and outlook to 2022. Published April 2018. Accessed April 2018.
*Includes protected brand medicines only (ie, brand medicines without generic versions available in the year indicated).
**Net price growth reflects impact of off-invoice rebates and discounts provided by manufacturers.

Insurers and PBMs have a lot of leverage to hold down medicine costs.

Negotiating power is increasingly concentrated among fewer pharmacy benefit managers (PBMs).



Insurers determine:

FORMULARY
if a medicine is covered

TIER PLACEMENT
patient cost sharing

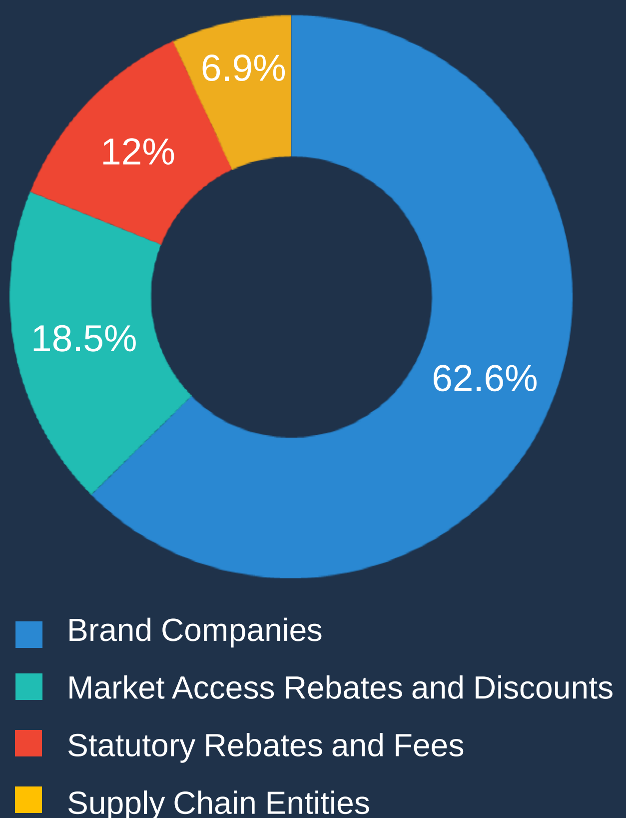
ACCESSIBILITY
utilization management through prior authorization or fail first

PROVIDER INCENTIVES
preferred treatment guidelines and pathways

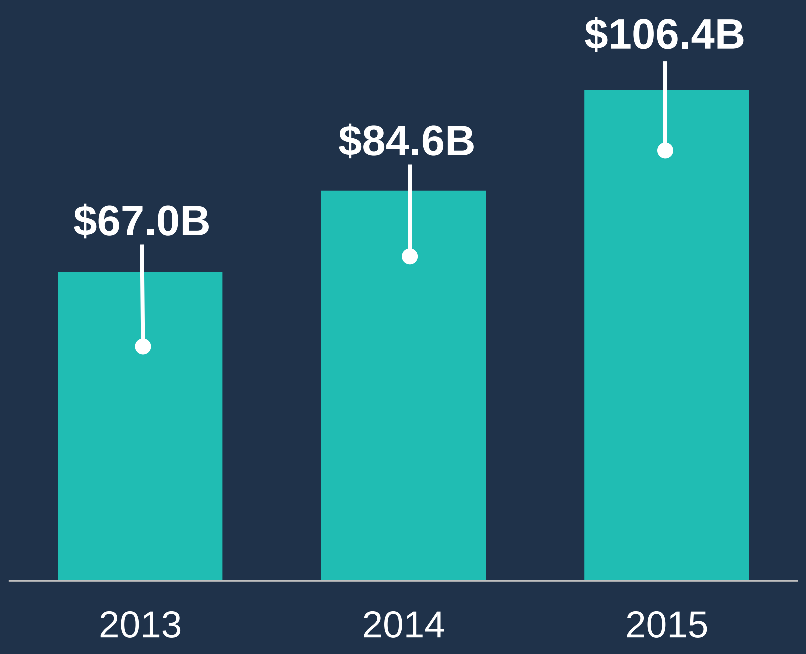
Note: OptumRx and Catamaran merged in 2015. Their 2014 shares are shown combined.
Source: Drug Channels. Institute, 2018.

In fact, more than 1/3 of the list price is rebated back to payers, the government and other stakeholders in the supply chain.

Brand companies retain just 63% of list price spending on medicines



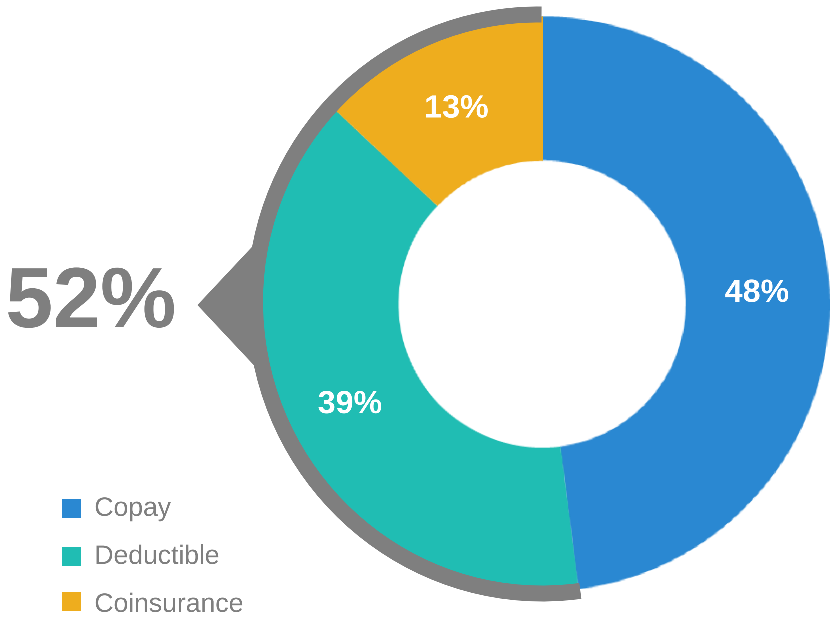
Rebates, discounts and fees keep increasing



Source: Berkeley Research Group.

And too often negotiated savings do not make their way to patients.

More than half of commercially insured patients' out-of-pocket spending for brand medicines is based on the full list price



Cost sharing for nearly 1 in 5 brand prescriptions is based on list price

Source: Amundsen Consulting Group study.

Sharing negotiated discounts with patients would increase premiums about 1%.

Certain commercially insured patients could save $145 to more than $800 annually.

Change in Plan Costs with Shared Rebates

	PLAN TYPE		
	Traditional PPO	**Copay HDHP***	**Coinsurance HDHP**
Net Plan Per Member Per Month Spend	$433.91	$374.41	$372.89
Change in Plan Costs $	$0.82	$2.62	$3.84
Change in Plan Costs %	0.2%	0.7%	1.0%

NOTE: Plan cost includes medical and pharmacy claims
*HDHP = High-deductible health plan

How the Medicaid Drug Rebate Works

FOR BRAND DRUGS IN MASSACHUSETTS

To ensure coverage of prescription medicines for Medicaid enrollees, under Federal law the Medicaid Drug Rebate Program requires pharmaceutical manufacturers to provide rebates in exchange for Medicaid coverage of their drugs.

Basic Rebate

The Greater of:
AMP - Best Price
OR
Minimum Rebate
(23.1% of AMP)

+

Consumer Price Index Rebate

Paid if the price increases by more than CPI:
Paid cumulatively to protect states from price increases higher than inflation

+

"Supplemental" Rebate

Negotiated by manufacturers for enhanced access for patients through preferred drug lists
(14% minimum mandated by state law)

$44.1 Million

=

2017 Rebates (Brand Only)

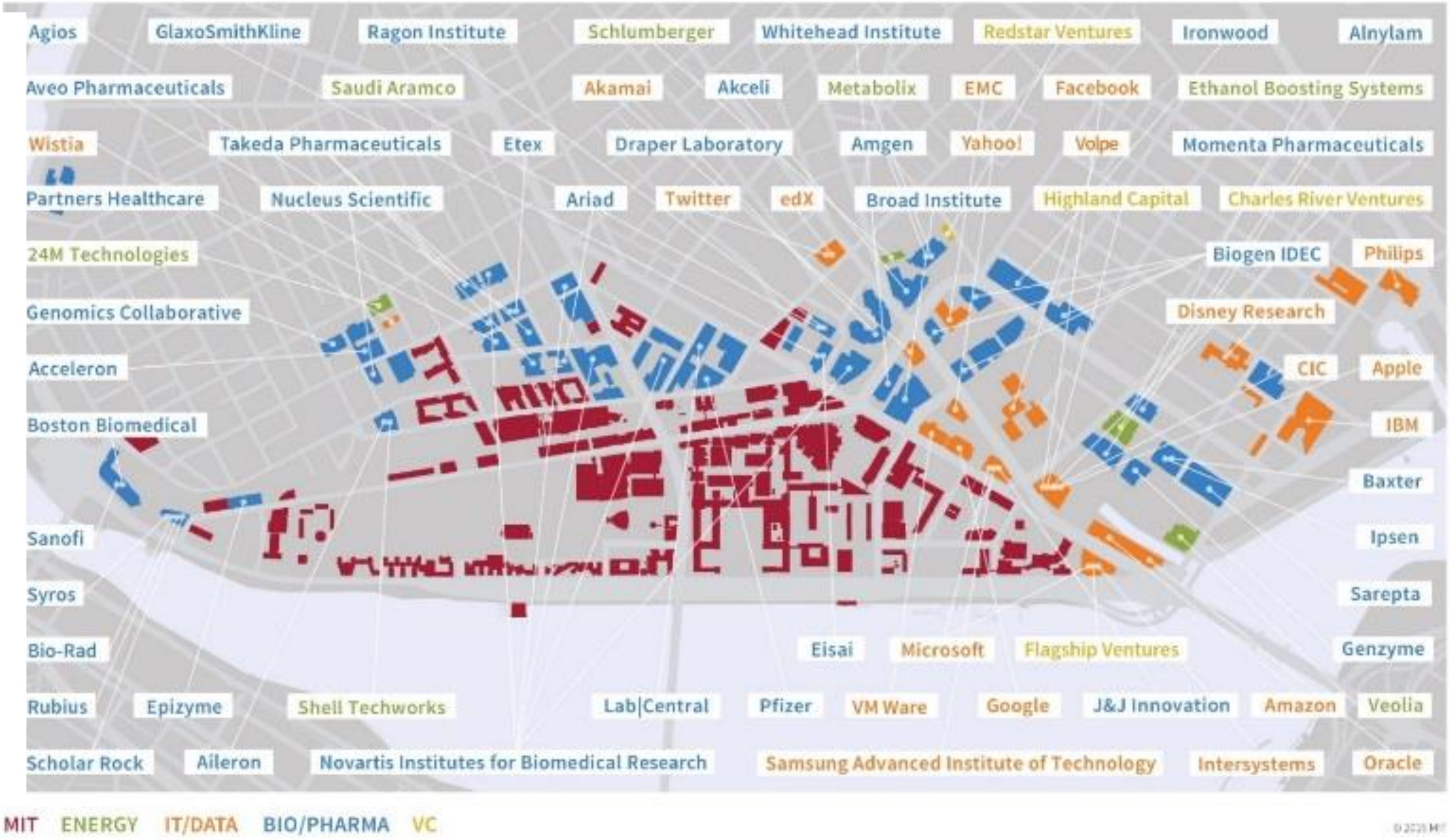
$784.3 Million

AMP – Average Manufacturer Price
Best Price – Lowest price drug sold to any non-government purchaser excluding certain sales (VA, Part D and 340B)

The Bio/Pharma presence in Cambridge provides access to a pipeline of talent, partnerships, and innovation

Cambridge, MA boasts:

- Access to **> 66K biopharma employees** in MA
- **300+ biotech companies** in Boston/Cambridge
- Addition of **> 11M square feet of lab space** in last 10 years
- **Greatest NIH funding per capita** in country and 5 of the top 6 NIH-funded hospitals
- **30% of all U.S. biotech venture capital** dollars goes to MA



Source: MassBio 2017 Industry Snapshot