



# Pharmacy Reimbursement Trends in Massachusetts

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# Executive Summary

In June 2019, the Massachusetts Health Policy Commission (HPC) published a DataPoints issue titled, “*Cracking Open the Black Box of Pharmacy Benefit Managers.*” In the report, the organization discussed a practice by pharmacy benefit managers (PBMs) called “**spread pricing,**” in which the PBM charges its client one price for a covered drug and pays a different price to the pharmacy. This practice is in contrast to “**pass-through pricing,**” in which the PBM charges the client a price for a drug and pays the pharmacy that same price. In this model, the PBM charges the client a predetermined administrative fee. Pass-through pricing models that price drugs based on their actual acquisition cost (plus a dispensing fee to compensate pharmacies for their services) are called “cost-plus pass-through” models.

PBMs argue that **spread pricing provides their clients predictability on drug prices** viz-a-viz cost-plus pass-through models. However, HPC showed that this pricing practice can lead to significant disconnects between what the client pays for a drug and its true cost. This is especially true for generic drugs, whose true costs can deflate considerably over time.

HPC’s analysis compared and contrasted drug prices in its Medicaid fee-for-service program with its managed care program, called Mass-Health Managed Care. In a Medicaid fee-for-service (FFS) program, the Centers for Medicare & Medicaid Services (CMS) requires a transparent cost-plus pass-through model. However, in the contracts between managed care organizations (MCOs) and PBMs, spread pricing is allowed, **resulting in heavily inflated prices** on some generic drugs.

HPC also investigated trends over time, comparing generic drug costs to the pharmacy acquisition cost of these same generic drugs, as measured by CMS’ National Average Drug Acquisition Cost (NADAC). HPC illustrated clear gaps between what managed care paid for its drugs and what these drugs cost pharmacies to purchase. However, the true cost of the problem remained unclear. HPC acknowledged that its “methods represent only an approximate indication of how large PBM profits may be on generic drugs,” due to the limitation that “there are no publicly available data on PBM reimbursement rates to pharmacies.”

Pass-Through Pricing



Spread Pricing



*HPC illustrated clear gaps between what managed care paid for its drugs and what these drugs cost pharmacies to purchase.*

This was the current state of affairs when the Massachusetts Independent Pharmacists Association (MIPA) commissioned 3 Axis Advisors, LLC to look into the matter. To provide a better understanding of the magnitude of both pharmacy and PBM profits within the MassHealth Managed Care program, 3 Axis collected de-identified prescription claims data from 43 of the state’s independent and small chain pharmacies. These pharmacies represent approximately 23% of the independent pharmacies and 4% of the overall retail pharmacies in Massachusetts.

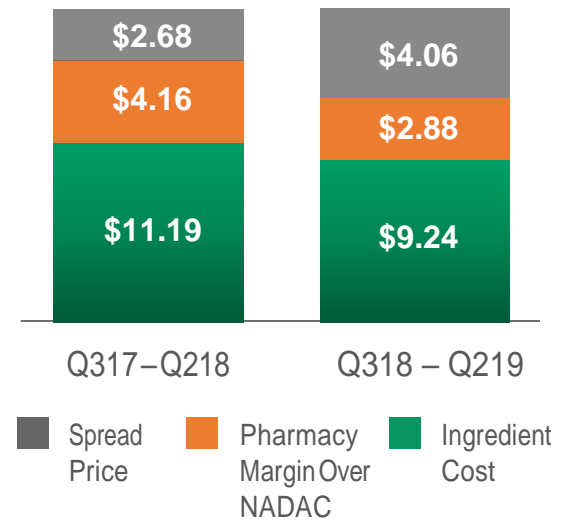
With this data, 3 Axis was able to estimate the proportion of MassHealth Managed Care’s generic expenditures paid out to pharmacy providers, versus that which was retained by the PBM and/or MCO through spread pricing.

Between Q3 2018 and Q2 2019, 3 Axis estimated that \$4.06 per prescription in spread pricing was taken per claim, equivalent to a 33% markup over the \$12.12 per prescription paid by PBMs to Massachusetts pharmacies. The 33% markup is in line with 3 Axis’ findings in New York (32%) but slightly below 3 Axis’ findings in Michigan (40%) and the Ohio state auditor’s findings in Ohio (46%).

Over the same period, **3 Axis also found that pharmacies were reimbursed at a level that provided just \$2.88 in margin over acquisition cost.** This margin is less than a third of the \$10.02 per prescription cost to dispense for the average Massachusetts pharmacy and only 25% of the \$11.40 per prescription cost to dispense for the average non-chain Massachusetts pharmacy.

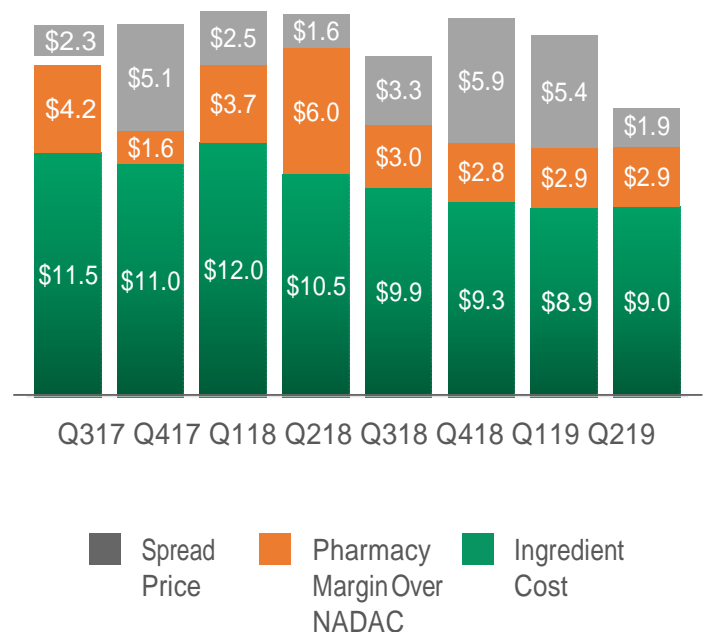
Drilling deeper, 3 Axis found that Massachusetts pharmacies have not been paid the state’s prescribed \$10.02 cost to dispense in each of the past eight quarters. Pharmacy margin varied between a low of \$1.61 per prescription in Q4 2017 to a high of \$6 per prescription in Q2 2018.

Massachusetts Medicaid MCO  
Cost per Generic Oral Solid Prescription



*\$4.06 per prescription in spread pricing was taken per claim, equivalent to a 33% markup.*

Massachusetts Medicaid Care Cost per Prescription Breakdown — Generic Oral Solids



Interestingly, PBM/MCO spread varied between nearly identical amounts: \$1.62 per prescription in Q2 2018 and \$5.85 per prescription in Q4 2018. This was despite not having to invest funds into purchasing the drug and dispensing it to the Medicaid beneficiary.

As HPC pointed out in its analysis, MCOs are not required to reimburse pharmacies for claims based on the acquisition cost of the claim. Without this requirement, pharmacies run the risk of receiving reimbursements for a drug that are disconnected from the drug’s cost. Reimbursements can even be below a pharmacy’s cost to acquire a drug, a situation known as an “**underwater claim**.”

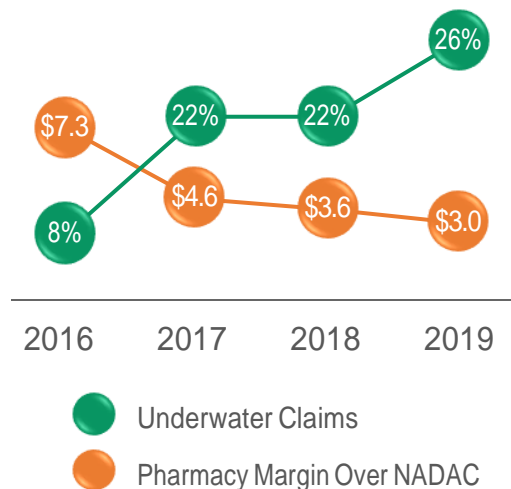
As part of this study, 3 Axis directly calculated the number of underwater claims in MassHealth Managed Care and found that it has increased from just 8% of generic claims in 2016 to 26% of generic claims in 2019. **The rise in underwater claims was a key driver of the 59% decline in pharmacy gross margin over the same period.**

However, as HPC discovered, managed care reimbursements can also be significantly higher than the acquisition cost. HPC found that the two generic drugs with the most excessive MCO/PBM pricing were generic Valcyte (valganciclovir) and generic Xeloda (capecitabine). In Q4 2018, valganciclovir was priced \$1,134 per prescription above its acquisition cost, while capecitabine was priced \$871 per prescription above its acquisition cost. When 3 Axis investigated the payments pharmacies received for these two drugs, it found no prescriptions for either drug



dispensed in Medicaid managed care by any of the 43 pharmacies. This potentially highlights another tactic that PBMs and health plans use to pressure pharmacy reimbursements: They **block nonaffiliated community pharmacies from dispensing highly profitable prescriptions**, leaving them with a disproportionate amount of low-profit prescriptions. This “drug mix” shift can dramatically reduce a pharmacy’s overall profitability.

Massachusetts MCO Oral Solid Generic Claim Margin vs. % Underwater Claims



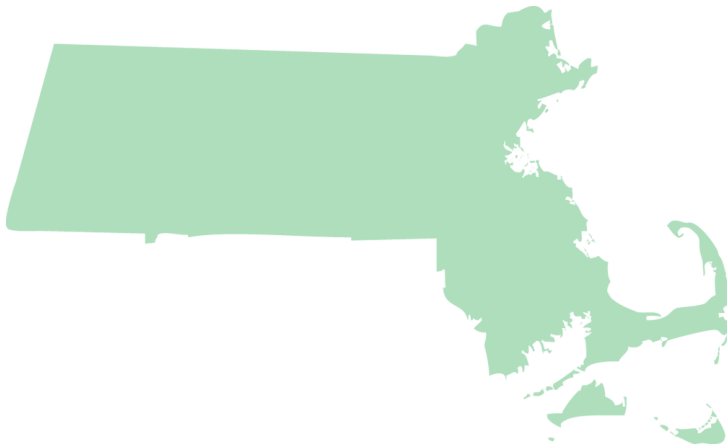
*Underwater claims increased from just 8% of generic claims in 2016 to 26% of generic claims in 2019.*

*“Drug mix” shift can dramatically reduce a pharmacy’s overall profitability.*

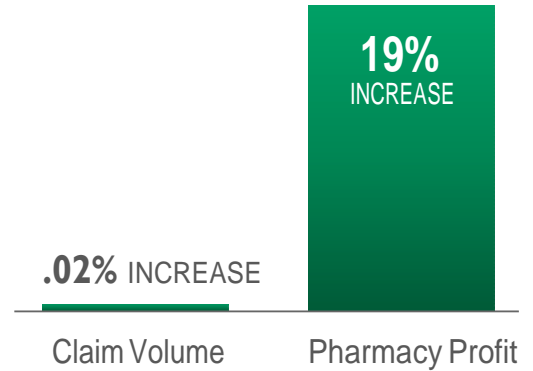


To investigate this dynamic further, 3 Axis identified the top 10 drugs in Massachusetts managed care that were priced by PBMs at the highest premium to their acquisition cost in 2019. Then 3 Axis modeled the change in profitability at the 43 pharmacies had they received their pro rata share of these top 10 generic drugs. The firm found that this adjustment would increase claims volume by just 0.02% (20 claims, overall). However, this insignificant uplift to claims volume would have increased total 2019 gross profit for these pharmacies by 19%. In other words, adding just 20 of these high margin claims to the more than 80,000 generic claims dispensed in 2019 by the 43 pharmacies 3 Axis studied would have **increased their overall margin from \$3 per prescription to \$3.56 per prescription.**

Overall, this study presents strong evidence that current pharmacy compensation is, by Massachusetts' own standards, not appropriate. The transparency on the data and methods, combined with ample education on the inner workings of the drug supply chain provided in this study, should assist Massachusetts in achieving its goal of providing "appropriate compensation for both pharmacies and PBMs."



### Impact on Pharmacies That Received Pro Rata Share of Top 10 Highest Markup Generic Drugs (2019)



*This study presents strong evidence that current pharmacy compensation is, by Massachusetts' own standards, not appropriate.*

### **Enhanced for Digital Readers**

A glossary of key terms is presented in Appendix B. The digital version hyperlinks via **orange bold underline** text the first instance of a term to the glossary. Similarly, concepts will appear in green underline text when they are referencing other areas of this report. Readers can navigate to these sections quickly via a left-mouse click on the hyperlinks.

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# 4 ANALYSIS OF PBM REIMBURSEMENT TO MASSACHUSETTS PHARMACIES

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## 4.1 OVERVIEW OF PHARMACY REIMBURSEMENT FROM PBMS

This section provides an overview of the reimbursement mechanisms [pharmacy benefit managers \(PBMs\)](#) use to pay pharmacies for the drugs they dispense. By highlighting the current contractual relationships between pharmacies and PBMs, we will identify and discuss how the reimbursement structure incentivizes certain actions by pharmacy providers that may not be aligned with the ultimate payer of prescription drugs: patients and plan sponsors. This analysis uses prescription claims history from 43 Massachusetts pharmacies and payments they receive within the state’s Medicaid program. The Massachusetts Medicaid program was selected because it will allow us to compare payments to pharmacies by their PBMs with charges by the PBM to the health plan (in this case, Massachusetts Medicaid). Medicaid programs are among the few with readily available public information on pharmacy claim payments by health plans nationwide. The 43 pharmacies from which we received data represent approximately 23% of the independent pharmacies and 4% of the overall retail pharmacies in Massachusetts.<sup>1</sup> Their pharmacy claim experience will be used primarily for the analysis in this section. For more information about this database, please refer to the [Data Sources](#) section toward the end of this report.

### 4.1.1 Components of a Pharmacy Claim

At its most basic level, a claim between a pharmacy and PBM consists of a net payment for the drug (i.e., ingredient cost paid) and a reimbursement for the cost to dispense (i.e., dispensing fee paid). According to the [National Council for Prescription Drug Program \(NCPDP\)](#), which as per the [Health Insurance Portability and Accountability Act \(HIPAA\)](#) is the organization responsible for setting the electronic transaction standards for claims processing, the complete formula for calculating the total amount paid on a claim is as follows:<sup>2</sup>

$$\begin{aligned} \text{Total Amount Paid (509-F9)}^3 &= \text{Ingredient Cost Paid (NCPDP Field\# 506-F6)} \\ &+ \text{Dispensing Fee Paid (NCPDP Field\# 507-F7)} \\ &+ \text{Incentive Amount Paid (NCPDP Field\# 521-FL)} \\ &+ \text{Other Amount Paid (NCPDP Field\# 565-J4)} \\ &+ \text{Flat Sales Tax Amount Paid (NCPDP Field\# 558-AW)} \\ &+ \text{Percentage Sales Tax Amount Paid (NCPDP Field\# 559-AX)} \\ &- \text{Patient Pay Amount (NCPDP Field\# 505-F5)} \\ &- \text{Other Payer Amount Recognized (NCPDP Field\# 566-J5)} \end{aligned}$$

After the claim transacts between the pharmacy and PBM, the pharmacy will receive a reimbursement payment for the drugs dispensed, and the PBM’s client will receive a bill for those claims; each pharmacy and PBM client is reimbursed and billed according to their individual contracts. These contracts can vary across pharmacy types, pharmacy chains, and by PBM client.

Despite this level of detail in pharmacy claims adjudication, the total amount paid on a pharmacy claim by a client often does not represent the net amount a pharmacy will receive to dispense a given medication. This is because, in addition to payment amounts associated with the fields above, there

are processing fees that PBMs may charge and annualized PBM contract guarantees (i.e., [generic effective rates](#) (GERs), [withhold amounts](#), etc.), which may adjust the net value of the adjudicated payment to the pharmacy long after the claim has been dispensed. By starting with the pharmacy claims and working our way through the relationship between PBMs, pharmacies, and ultimately health plans, we can demonstrate the impact that current contractual relationships have to both pharmacies and health plans – and, by extension, the state of Massachusetts.

#### 4.1.2 Ingredient Cost Paid

The ingredient cost component of the claim payment recognizes the cost the pharmacy incurs to acquire a drug from a drug wholesaler or manufacturer.<sup>4</sup> For state-run Medicaid pharmacy programs, the Centers for Medicare and Medicaid Services (CMS) requires a reimbursement structure for pharmacies predicated on payment for the [actual acquisition cost \(AAC\)](#) of the product being dispensed. AAC should be a “determination of the pharmacy providers’ actual prices paid to acquire drug products marketed or sold by specific manufacturers.”<sup>5</sup> The intent with ingredient cost reimbursements, therefore, should be to sufficiently cover drug costs and not to provide a source of profit for pharmacies.

This goal can be difficult to achieve, given that not all equivalent medications will be priced the same from the various drug manufacturers or the wholesalers and pharmacies who could supply the therapy. Each entity within the supply chain has variability in its cost structure and ability to secure pricing discounts from vendors within the drug supply chain. Nonetheless, Massachusetts has itself identified the [National Average Drug Acquisition Cost \(NADAC\)](#) as the best available benchmark for AAC based upon regulations adopted for the state-run Medicaid program.<sup>6</sup>

Contrary to state-run Medicaid programs, [managed care organizations \(MCOs\)](#), including those hired by Massachusetts to operate within its Medicaid program, are not required to pay for ingredient costs based on AAC but must make payments sufficient to ensure appropriate access for their enrollees.<sup>7</sup> MCOs typically contract with a PBM rather than setting payment rates themselves. Unlike state-run Medicaid programs, PBMs negotiate aggregate payment terms with individual pharmacy providers and provider groups rather than applying a transparent and equitable payment formula to all claims and providers.

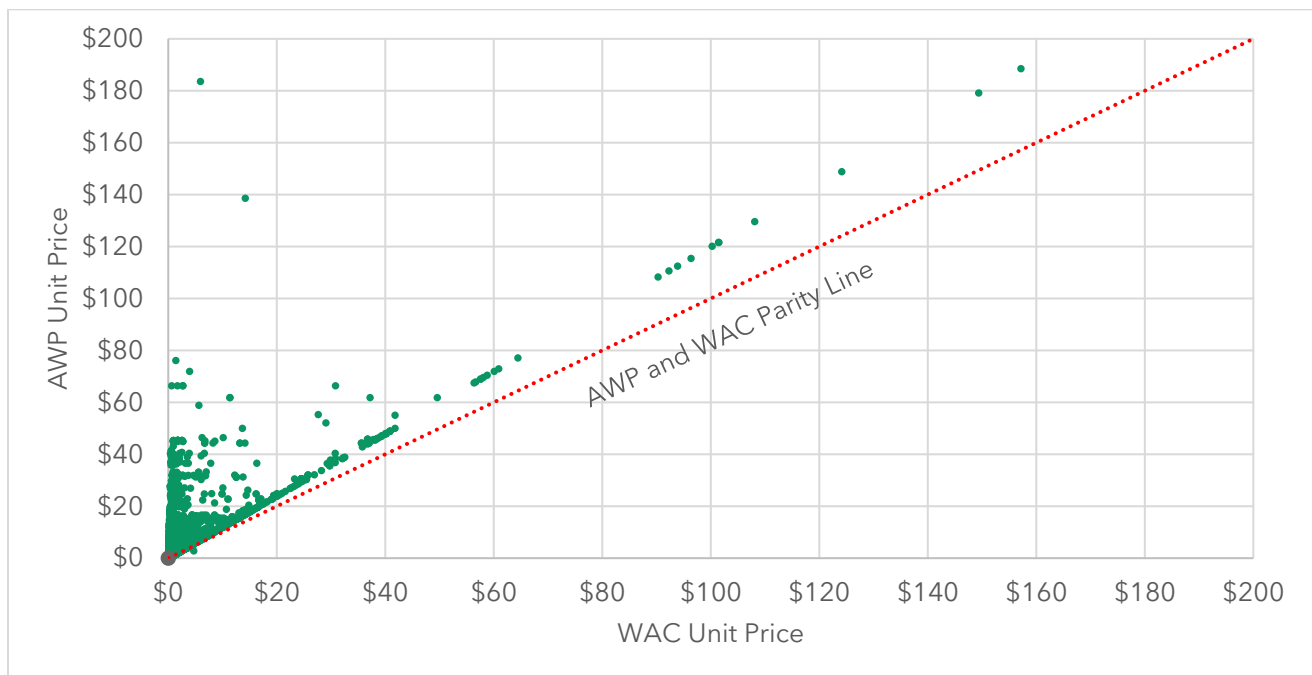
The typical PBM contract to a pharmacy reimburses a pharmacy claim at the lesser of the pharmacy’s submitted cost for service or a discount of some percent to a drug pricing benchmark, such as [Average Wholesale Price \(AWP\)](#), [Wholesale Acquisition Cost \(WAC\)](#), or a [Maximum Allowable Cost \(MAC\)](#). PBMs usually do not make their pricing structure available in the public domain and may not offer the same terms to all pharmacies within their networks. If a pharmacy has a contractual guarantee (many do not), it is not on any individual claim payment, which if they did, would ensure that, at a minimum, reimbursement for their drug ingredient costs would be equal to the cost to acquire. The guarantee will be a discount to the aggregate benchmark price (i.e., AWP or WAC) across a group of brand or generic claims. Moreover, contracts typically give the PBM the leeway to define: (1) the benchmark; (2) the source and timing of the pricing benchmark check; and (3) the definition of what is a brand and what is a generic for the purposes of complying with the guarantee. As pointed out by PBM contracting expert Linda Cahn, the flexibility PBMs demand in setting contractual terms obviates the value of any guarantee.<sup>8</sup>

#### 4.1.2.1 Pricing Benchmarks for Ingredient Costs

For the purposes of our report, we will rely upon NADAC to estimate actual acquisition costs for prescription medications, as it is the benchmark established within Massachusetts rule for its state-run **Fee-for-Service (FFS)** program. Absent a goal to use the most accurate price to represent pharmacy acquisition costs, if the goal of any payer (PBM or health plan) or analyst is to identify the lowest ingredient cost, we find that NADAC offers the lowest price benchmark for the majority of prescription medications.

To demonstrate NADAC's role as the lowest price benchmark, we compared the price of all **oral solid** prescription medications dispensed within Massachusetts Medicaid in 2019 to each of the various pricing benchmarks available for the **national drug code (NDC)** dispensed (i.e., AWP to WAC, AWP to NADAC, WAC to NADAC). To perform this analysis, we joined the average AWP per unit price of each drug by NDC to the corresponding average WAC per unit or NADAC per unit of that NDC for those that have all three pricing benchmarks available. Medi-Span Drug Database was the source of AWP and WAC pricing data. Of the potential 7,195 oral solid NDCs for review, 6,248 NDCs had all three pricing benchmarks available (87%). Note that if these pricing benchmarks were equivalent, the ratio between each would be a straight line of green NDC dots from corner to corner in the three figures that follow. We represented this parity line in each of the figures in red.<sup>a</sup> We began our analysis by comparing AWP to WAC, graphing the AWP price per unit on the y-axis and WAC price per unit on the x-axis, with each green dot representing an NDC. As demonstrated in **Figure 4-1**, AWP is consistently more expensive per unit than WAC, as nearly all green dots (6,203 out of 6,248 NDCs; 99%) are above the red parity line. This should not come as a surprise given that, for brand-name drugs, AWP is commonly set exactly 20% above WAC by drug pricing references such as Medi-Span.<sup>9</sup>

Figure 4-1: AWP vs. WAC Comparison, Oral Solid NDCs at 43 Pharmacies within Massachusetts Medicaid, 2019



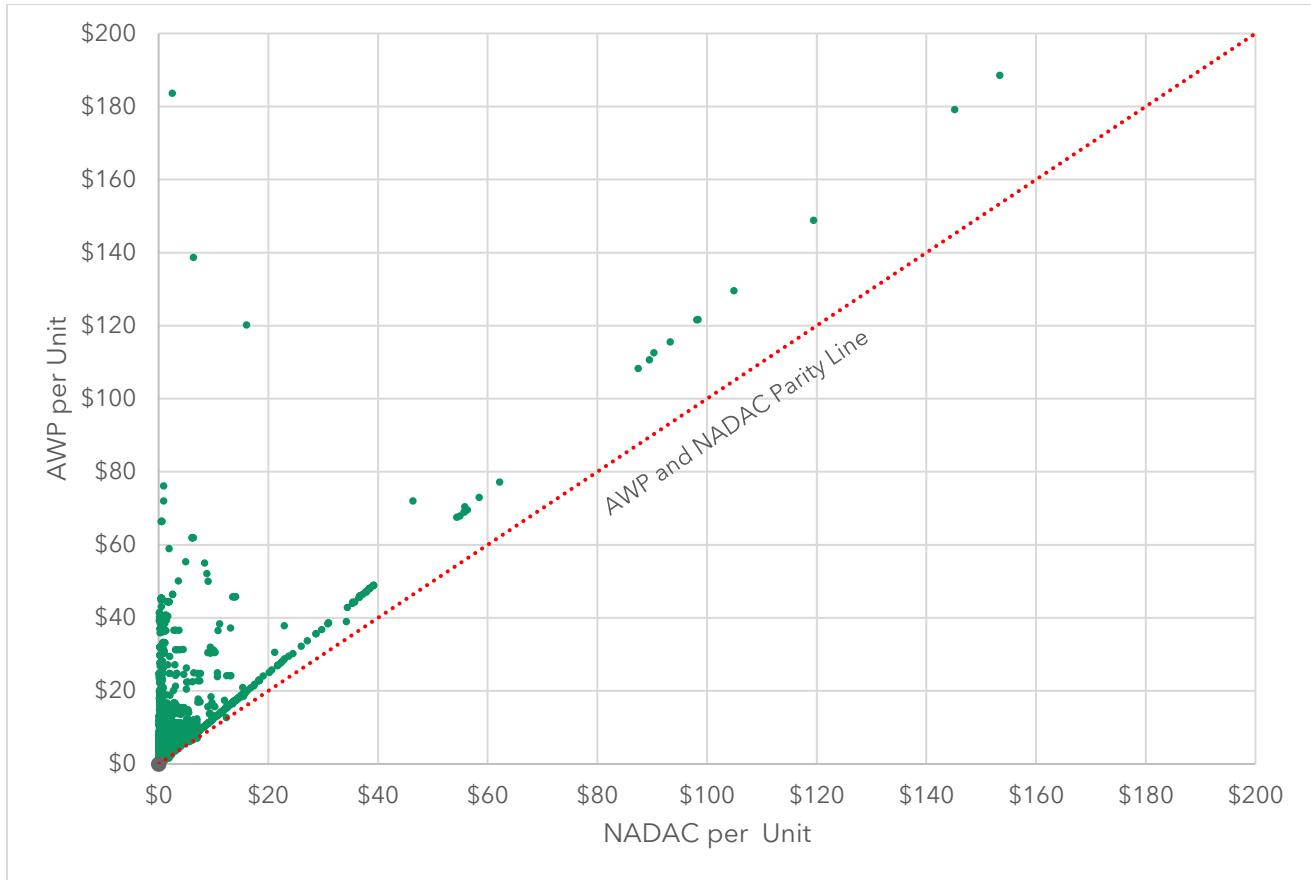
Source: 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid, Medi-Span Price Rx

<sup>a</sup> For all Figures in Section 5.1.2.1 comparing pricing benchmarks, we limited the axis to \$200 or less per unit to aid in visualization. All data points were included as part of this comparison despite the limits placed on the axes.



Performing the same analysis in [Figure 4-1](#) but changing the comparison to AWP to NADAC, we see in [Figure 4-2](#) that AWP was consistently more expensive per unit than NADAC across all oral solid NDCs in Massachusetts Medicaid in 2019. The fact that AWP is more expensive, on average, than both WAC and NADAC is unsurprising considering that AWP has been known to be an unreliable prescription drug pricing benchmark for at least a decade.<sup>10</sup> Therefore, insofar as the desire of this analysis is to use the lowest pricing benchmark for prescription medication acquisition cost, AWP would not appear to be the best choice for this analysis, to say nothing of its prominent role in contracts between PBMs and payers.

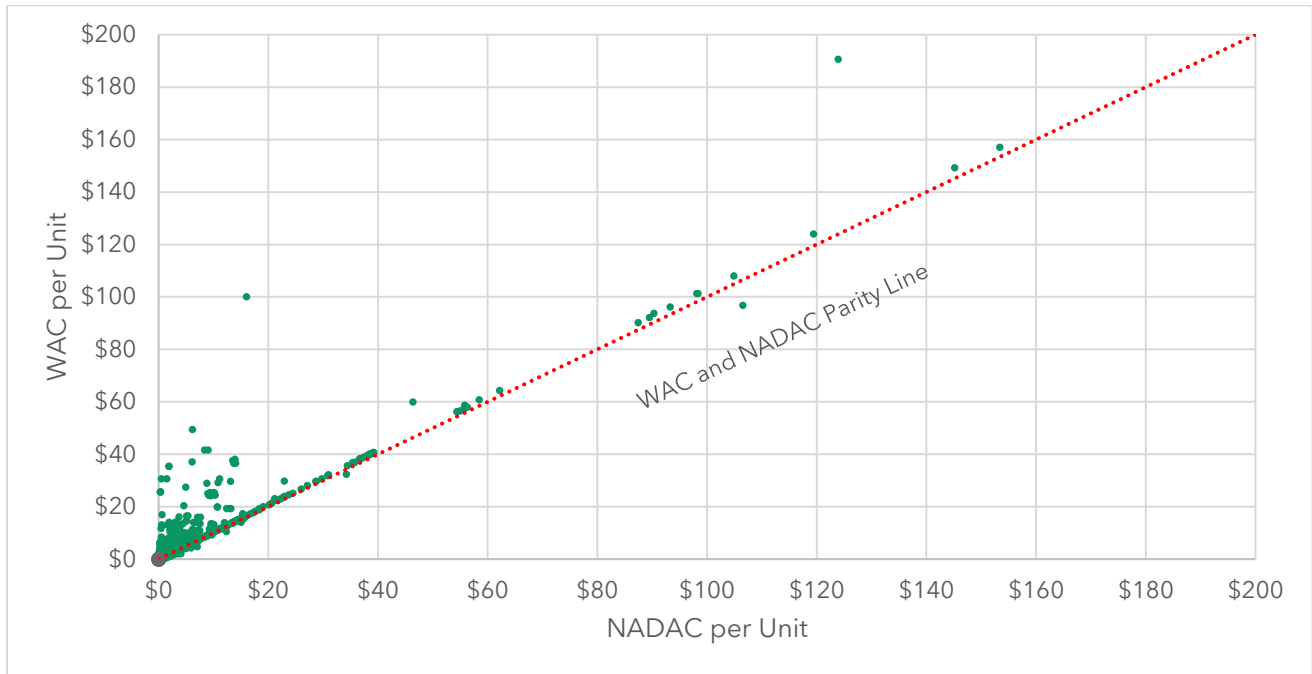
**Figure 4-2: AWP vs. NADAC Comparison, Oral Solid NDCs at 43 Pharmacies within Massachusetts Medicaid, 2019**



*Source: 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid, Medi-Span Price Rx, CMS NADAC*

The final comparison we make is between WAC and NADAC. As seen in [Figure 4-3](#) on the following page, we again see that NADAC is lower for the majority of NDCs than WAC. Note that unlike the comparisons to AWP, 5% of the total NDCs (291 out of 6,248) have a per unit WAC price that is lower than their per unit NADAC. By comparison, for 93% of the NDCs (5,789), WAC is higher than NADAC. When NADAC is higher, it averages \$0.16 per unit above WAC on an NDC basis. When WAC is higher than NADAC, it averages \$0.75 per unit above NADAC.

Figure 4-3: WAC vs NADAC Comparison, Oral Solid NDCs at 43 Pharmacies within Massachusetts Medicaid, 2019



Source: 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid, Medi-Span Price Rx, CMS NADAC

Based upon the comparisons of pricing benchmarks for the same group of NDCs within the same year, if the goal is to reimburse pharmacies the lowest ingredient cost based on a pricing benchmark, the best available pricing benchmark would appear to be NADAC. Outside the observations within the Massachusetts pharmacy claims and the NDCs presented here, CMS—via its contractor, Myers and Stauffer—conducts an ongoing analysis to illustrate this same finding. Assessments conducted by Myers and Stauffer compare the aggregate mean and median discounts for prescription medications between AWP, WAC, and NADAC.<sup>11</sup> As shown in Figure 4-4, their findings consistently demonstrate that NADAC is the lowest price point in the aggregate.

Figure 4-4: Myers and Stauffer NADAC Equivalency Metrics

Quarter Ending	Brand Legend Drugs				Generic Legend Drugs			
	WAC Mean	WAC Median	AWP Mean	AWP Median	WAC Mean	WAC Median	AWP Mean	AWP Median
December 2018	-4.3%	-4.0%	-20.3%	-20.0%	-47.7%	-51.9%	-78.4%	-86.1%
March 2019	-4.6%	-4.0%	-20.6%	-20.0%	-47.3%	-51.7%	-78.8%	-86.2%
June 2019	-4.4%	-4.0%	-20.4%	-20.0%	-45.8%	-49.5%	-78.4%	-85.7%
September 2019	-4.1%	-4.0%	-20.2%	-20.0%	-46.4%	-50.3%	-78.9%	-86.2%
December 2019	-4.3%	-4.0%	-20.4%	-20.0%	-45.4%	-49.9%	-78.6%	-85.9%

Source: Medicaid.gov Retail Price Survey

Similarly, if the goal is to reimburse pharmacies at the cost they incur to acquire drugs, NADAC would also appear to be the best available pricing benchmark. This is because NADAC, unlike AWP or WAC, is directly derived from a survey of retail invoice costs to acquire drugs.<sup>12</sup> Conversely, AWP and WAC are either supplied directly by the drug manufacturer or calculated by intermediaries based on a cost supplied by the drug manufacturer.<sup>13</sup> As a result, AWP and WAC, to a degree, function more like a manufacturer suggested retail price (MSRP) and cannot be reasonably presumed to represent costs pharmacies incur to acquire drugs.

#### 4.1.2.2 Maximum Allowable Cost

The only remaining pricing benchmark to analyze would be the PBM's MAC list. Because different manufacturers will charge different amounts for interchangeable generic drugs, a MAC list incentivizes the purchase of the least costly generic drugs available in the market regardless of available pricing benchmarks. According to the Academy of Managed Care Pharmacy (AMCP), "MAC price reimbursement is a more accurate pricing tool than other payment alternatives for generic drug reimbursement because MAC prices are updated frequently to keep pace with market changes in the purchase prices of generic drugs available to pharmacies."<sup>14</sup> Insofar as MAC lists represent the PBM industry's preferred method for pricing generic drugs, the lack of transparency around MAC-based pricing presents a potential risk to our analysis of whether MAC reimbursement is superior to NADAC as a measure of costs for pharmacies to acquire a given medication. We should acknowledge that there are additional concerns about PBM MAC lists besides price transparency, including their variability by plan sponsor and pharmacy, as this results in different charges for the same drug dispensed by the same pharmacy provider. Another concern with MAC rates is their adequacy in establishing a cost reflective of market realities.

These concerns exist in part because MAC lists are designed to provide reimbursements to pharmacies to cover their drug acquisition costs for their aggregated spend, meaning some drugs will be over-reimbursed and others under-reimbursed. These distortions can place a pharmacy at risk if the types of drugs dispensed, referred to as [drug mix](#), change considerably. Variability can be introduced when a drug is in short supply, a plan sponsor changes their formulary, or a wholesaler's preferred generic is different from the lowest equivalent generic price at other wholesalers—all factors outside the pharmacy's control. The ability of the MAC list to respond to these challenges of the drug supply chain is a factor which we cannot directly assess within our Massachusetts claims data; however, 3 Axis Advisors performed separate analysis which found that PBMs collectively did a poor job in adjusting MAC rates on generic drugs that experienced significant increases in pharmacy acquisition costs.<sup>15</sup>

Further complicating MAC pricing, PBMs can use the ambiguity in MAC rates as a means to extract hidden revenue from plan sponsors, using "[spread pricing](#)", which we discuss at length in [Section 5](#). Spread pricing occurs when a PBM sets a MAC rate, which it uses to pay the pharmacy for a specific drug claim, but then uses a different, higher rate on the same claim when billing a health plan or plan sponsor. The difference between the rate paid to the pharmacy and the rate charged to the plan is retained by the PBM as "spread."

To highlight how significant this spread can be, in 2018 the Ohio state auditor found PBM spreads that exceeded \$6 per prescription, accounting for \$225 million in costs from just one year in the Ohio Medicaid managed care program.<sup>16</sup> \$208 million of the \$225 million in spread pricing was assessed on generic drug transactions. This equated to 31% of the state's overall generic drug Medicaid expenditures, or a 46% markup to what Ohio's pharmacies were reimbursed for the state's Medicaid generic drug claims. These findings sparked a series of state and federal reforms.<sup>17</sup>

From a spread perspective, generic drugs are some of the most profitable for a PBM when more than one manufacturer is producing a version of the same generic drug. As more competitors drive down the actual cost of the generic drug, PBMs can contractually delay passing along the savings by charging stale, elevated rates (anchored to AWP) to plan sponsors and capturing the difference.

As we highlighted in our deep dive into the drug supply chain dynamics on Prilosec and Nexium in 2019, the ability for PBMs to freely set different prices for the same drug from pharmacy to pharmacy,

plan by plan, and day by day provides significant opportunities for excess PBM margin generation while creating winners and losers among the PBM's contracted providers and plan sponsors.<sup>18</sup>

PBMs even have external partners who can assist them in maximizing these spread opportunities. For example, Decision Resources Group (DRG), a "premier provider of healthcare analytics, data, and insight products and services," markets a variety of pharmacy benefit management tools and resources.<sup>19</sup> DRG Adaptive Software used to contain a module called RxPricing. While we do not know if the module has been discontinued, all information on the module has been expunged from DRG/Adaptive's website. However, we were able to find a description of the module using the Wayback Machine.<sup>20</sup> The module's description of its "Re-Pricing Analytics" feature is very helpful in gaining a better understanding of how much latitude PBMs have in setting generic drug pricing for clients:

"The re-pricing feature within RxPricing will help you maximize your spread by allowing you to create what-if scenarios and immediately see the financial impact of your changes. Modify your MAC list by GPI, GCN and GSN drug classification or specify overrides at the NDC level. Run real-time reports to calculate the current overall effective rate and projected overall effective rate to ensure you're meeting your client and network guarantees."

In a noteworthy turn, despite having touted the tool, which was specifically designed for PBMs to maximize spreads, after the controversy on spread pricing hit a boiling point nationally, a March 2019 blog post from DRG stated:

"With high drug prices the topic of the hour, pharmacy benefit managers have increasingly been put under the microscope from their methods of determining drug prices. They have been criticized nationwide for their opaque financial arrangements, unnecessarily complicating the system, and making it hard to trail the money. ... PBMs, which were established with the notion to help manage high drug prices, have been accused of doing just the opposite."<sup>21</sup>

Fortunately, despite the lack of transparency around PBM MAC prices, other entities have analyzed the relationship between PBM MAC lists and NADAC. A 2017 study commissioned by the Washington Office of the Insurance Commissioner (OIC) investigated MAC lists within the state's fully insured commercial markets. The report made several key findings, including, "In general, PBM MAC lists result in payments to pharmacies that are higher than the NADAC benchmark price and lower than the regional benchmark prices."<sup>22</sup> Other key findings are summarized in [Figure 4-5](#).

Figure 4-5: Washington OIC Study of Pharmacy Supply Chain—Key Findings on MAC Rates

#### Key Findings:

- + The number of drugs included on PBM MAC lists vary significantly across PBMs.
- + Aggregate PBM Wholesale Acquisition Cost (WAC) effective discounts of their MAC lists ranged from WAC -15.5% to WAC-38.0%, while regional benchmarks, and NADAC WAC discounts range from WAC -24.3% to WAC -30.6%. The PBMs demonstrated greater variance (e.g., larger range of effective WAC discounts as compared to national and regional benchmarks) with some PBM MAC lists having reimbursement rates more generous than the national and regional benchmarks (e.g., WAC – 15.5%), and other PBM MAC lists demonstrating more aggressive reimbursement rates (e.g., EAC - 38%) compared to the benchmarks.
- + In general, PBM MAC lists result in payments to pharmacies that are higher than the NADAC benchmark price and lower than the regional benchmark prices .

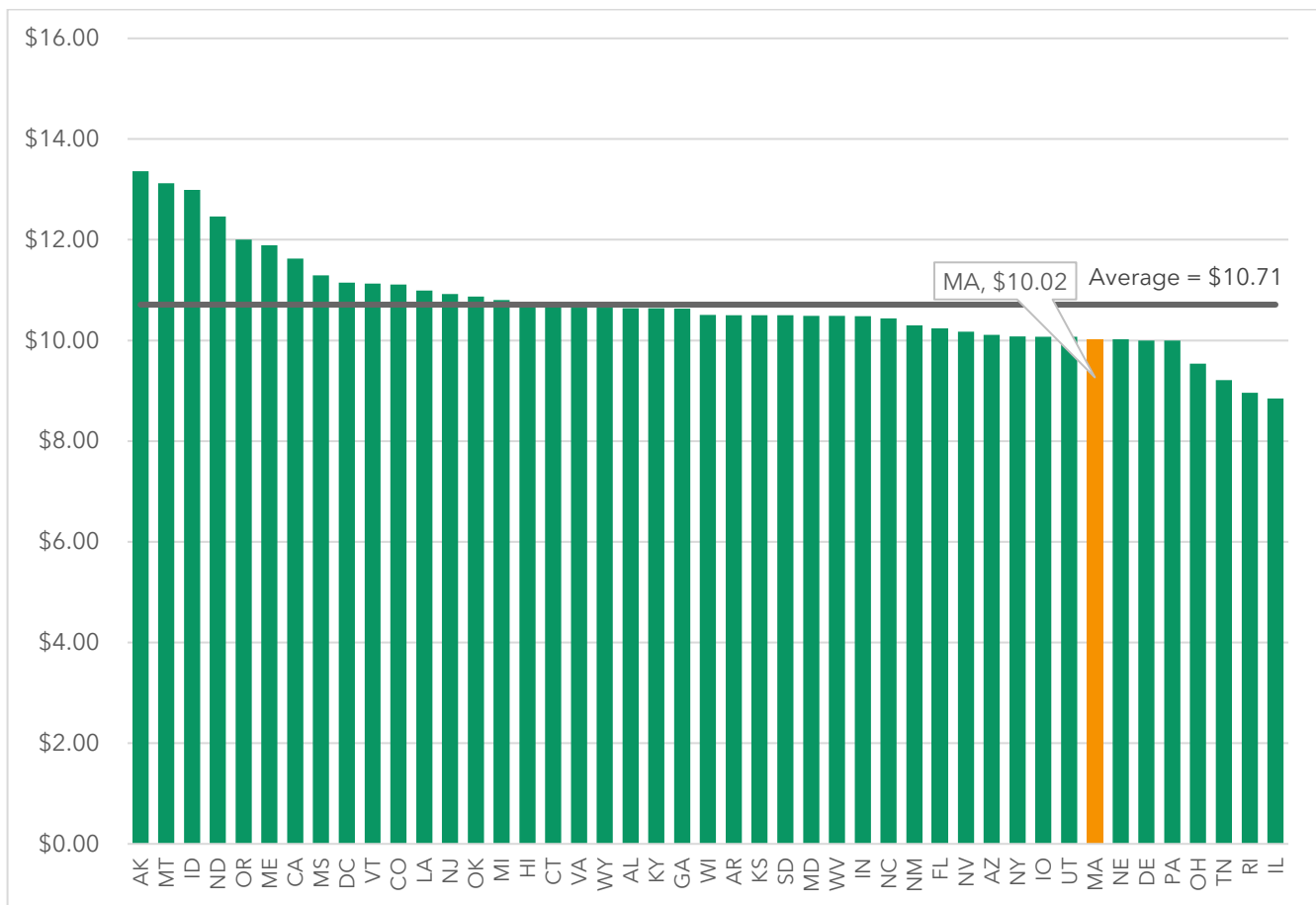
Source: Washington State OIC Study of the Pharmacy Supply Chain

While this finding represents the experience of one state (Washington) in one market (fully insured commercial healthcare), the findings emphasize that, since the goal is to pay the lowest market-available price when it comes to reimbursement of a drug’s ingredient cost, NADAC would appear to be the best available public pricing benchmark to achieve that goal.

### 4.1.3 Dispensing Fees

If the goal of the ingredient cost is to provide reimbursement sufficient to cover the cost pharmacy providers incur to acquire medications, a dispensing fee compensates the pharmacy for the work associated with transferring the drug from the pharmacy to the patient, including the overhead necessary to do so, such as materials, staff resources, patient counseling, and stocking and storing medications.<sup>23</sup> For states that have implemented an AAC-based payment methodology within their state-run Medicaid programs, dispensing fees to pharmacies generally pay between \$9 and \$12 per prescription. Massachusetts is paying below the national average at \$10.02 per prescription based upon a 2017 [cost of dispensing](#) survey conducted in the state, shown in [Figure 4-6](#).<sup>24 25 26</sup>

Figure 4-6: Average Professional Dispensing Fee as of September 2019



Source: 3 Axis Advisors’ analysis of professional dispensing fees from Medicaid.gov

The dispensing fees in state-run Medicaid programs are calculated based upon surveys of the average cost a pharmacy incurs to dispense a medication and must be reevaluated whenever the states propose to make changes to either ingredient cost reimbursement or dispensing fees.<sup>27</sup> This highlights the importance of the total pharmacy claim payment structure to pharmacies. If ingredient cost payments are going to be low, such as they would be with AAC based (i.e., NADAC)

reimbursement models, dispensing fees must be higher to sustain pharmacy operations. Following this logic, if dispensing fees are going to be low, ingredient cost payments need to be higher to sustain pharmacy operations, which is the intention of MAC-based reimbursement models.

However, as with ingredient cost reimbursement, MCOs within Medicaid are generally not required to conform with the same requirements as state-run Medicaid FFS programs. The differences are stark, with the average dispensing fee reimbursement from PBMs varying between \$0 and \$2 per claim across the various contracts we reviewed. As shown in [Table 4-1](#), our review of PBM contracts demonstrates that PBMs do not appear to value the appropriate transfer of medications from pharmacy to patient, as their reimbursements to pharmacies via dispensing fees are insufficient to cover pharmacy operating costs.

**Table 4-1: PBM Dispensing Fee Payments to Pharmacies**

Pharmacy Type	Brand Dispensing Fee	Generic Dispensing Fee
Retail	\$0-\$1.50	\$0-\$1.50
Mail Order	\$0	\$0
Specialty	\$0-\$0.20	\$0

*Source: 3 Axis Advisors' review of PBM contracts*

Seeing contractual dispensing fees at or close to zero helps explain why Washington found MAC rates to be higher than NADAC: If a PBM chooses to set a zero dispensing fee and wants to ensure that payments are sufficient to ensure appropriate access, it, by definition, will have to increase its MAC rate, reflecting some or all of the margin the provider receives for its services. This report will explore whether Medicaid managed care PBMs are setting MAC rates in a manner that makes up for the low dispensing fees to enough of a degree that cover our sample independent pharmacies' cost to dispense, or setting MAC rates in line with the ingredient cost and using the managed care carve-in to avoid having to pay sustainable dispensing fees to independent pharmacies across Massachusetts.

#### 4.1.4 Patient Pay Amount

The final component of the pharmacy claim payment structure to review is that of patient pay amounts, also referred to as copays or coinsurance. Payers of healthcare (i.e., PBMs, health plans) use copayments as a way to split the cost of services. A copay is a flat fee that a patient pays to receive specific healthcare services, whereas coinsurance is a payment by the patient based upon a percentage of the charge or agreed-upon rate. Within Medicaid, federal regulations allow for copayments of up to \$4 for [preferred drugs](#) and \$8 for [non-preferred drugs](#) for individuals with incomes under 150% of the federal poverty level (FPL). For individuals with incomes over 150% FPL, cost sharing may be up to 20% of the cost of the non-preferred drugs.<sup>28</sup> Massachusetts Medicaid has pharmacy copayments that are the same regardless of whether the patient is enrolled in the state-run program or in an MCO. These copayments are required for both first-time prescriptions and refills unless the member is excluded from copay requirements due to age or medical conditions, and are as follows:<sup>29</sup>

- \$1 for certain covered generic drugs and over-the-counter drugs mainly used for diabetes, high blood pressure, and high cholesterol. These drugs are called antihyperglycemics (such as metformin), antihypertensives (such as lisinopril), and antihyperlipidemics (such as simvastatin); and



- \$3.65 for each prescription and refill for all other generic, brand-name, and over-the-counter drugs covered by MassHealth.

It is important to note that pharmacy reimbursement from PBMs is reduced by the patient copay amount, as that portion of the pharmacy's net reimbursement is directly collected from the patient. Within Massachusetts Medicaid, if a member cannot afford the copayment at the time a pharmacy provides the service, a pharmacy cannot refuse services (i.e., dispensing the drug) to the member.<sup>30</sup> This is an important distinction because, insofar as reimbursement to the pharmacy is reduced by the payer/PBM, the pharmacy is at greater risk for financial harm from a member's inability to pay. Given that Medicaid is a program for those who are significantly impoverished, their ability to pay even a \$1 to \$4 per prescription charge may be challenging, particularly if they are on several medications. This is worth keeping in mind, particularly if the majority of reimbursement on a claim is coming from a copayment as opposed to the PBM/health plan.

## 4.2 COMPARISON OF REIMBURSEMENT FORMULAS BETWEEN STATE-RUN AND MCO-DELIVERED MEDICAID SERVICES

Now that we have a better understanding of how pharmacy claims transact between a pharmacy and a PBM, we can begin to evaluate how the different reimbursement models impact pharmacy operations by contrasting MassHealth (the state-run Medicaid FFS program) to Massachusetts MCOs. To do this, we will use NADAC as the underlying estimate of pharmacy cost to acquire prescription medications and examine how payments differ between the state-run and MCO programs.

To start, we will compare the amount of reimbursement provided above NADAC (i.e. [Margin over NADAC](#)) for all generic oral solid medications dispensed with an available NADAC cost per unit for the dispensed NDCs over time. We selected generic medications because they constitute the majority of medications dispensed (86% of prescription drug claims for all of Massachusetts Medicaid from 2016 to 2019), ensuring an adequate volume of claims to review. Brand-name drugs were excluded from the study because sizable rebates from the Medicaid Drug Rebate Program and 340B program pricing create significant distortions in unit costs reported by CMS for brand-name drugs.<sup>31</sup> For generic drugs, while there is a low risk in including non-oral solid drugs in our analysis, we need a uniform baseline that will work across all the analyses of this report. Due to limitations of CMS' [State Drug Utilization Database \(SDUD\)](#), there is no systematic way we can ensure there are no units of measure mismatches between this database and the other databases we have worked with as part of this report—CMS' NADAC database, Wolters Kluwer's Medi-Span PriceRx system, and most importantly, the de-identified, de-localized pharmacy data collected as part of the study). For oral solids, there is negligible risk of units of measure mismatches across all databases, so we have chosen to focus the study on this group of generic drugs. As can be seen in [Figure 4-7](#) on the following page, oral solids represent 85% of generic claims and 70% of cost for generic drugs across all of Massachusetts Medicaid from 2016 to 2019, according to the CMS SDUD.

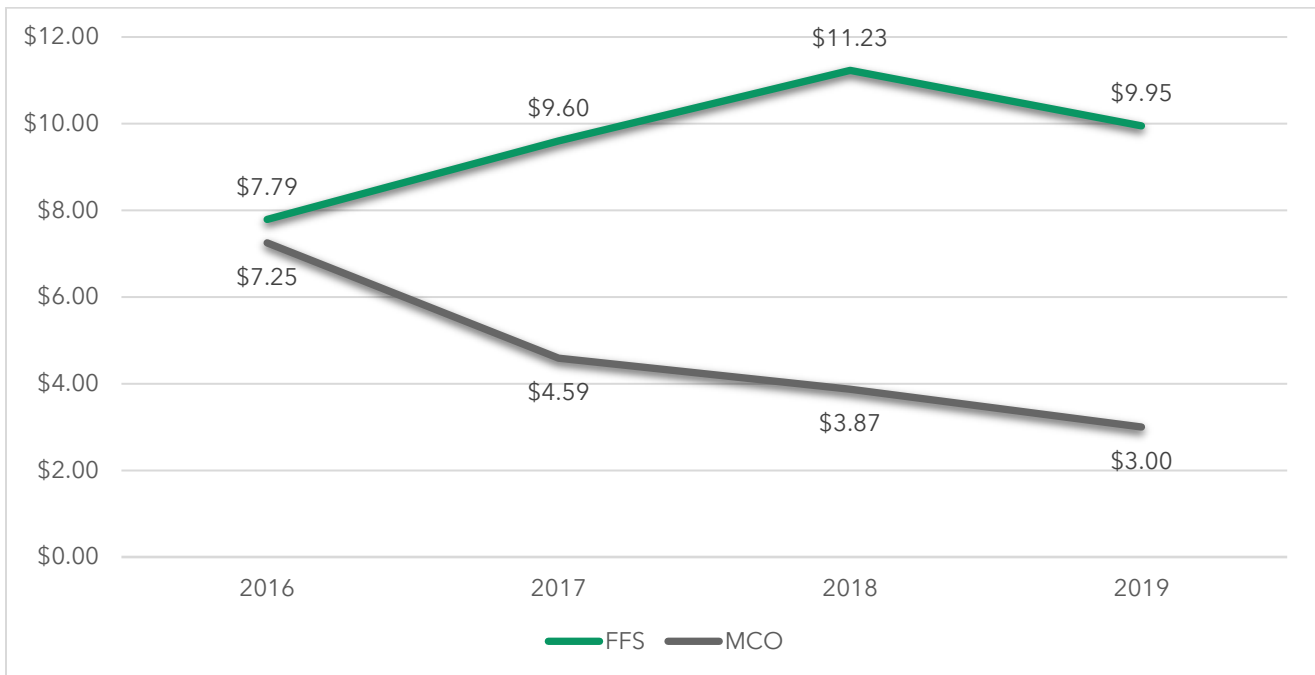
Figure 4-7: Massachusetts Medicaid Generic Drug Dosage Form Percent of Claims and Cost per CMS SDUD, 2016-2019



Source: CMS SDUD, Massachusetts

With a focus on generic oral solid medications, we can see in [Figure 4-8](#) that the amount of reimbursement provided over NADAC differs significantly between managed care and FFS programs over time. Despite similar gross margins in 2016, MCO reimbursements for the 43 pharmacies within our study have declined by over 50% in four years, compared to 28% growth in FFS, the latter driven by the CMS mandate (starting April 1, 2017) for all state-run programs to move to a cost-plus model based on an AAC.<sup>32</sup>

Figure 4-8: Margin over NADAC in Massachusetts Medicaid at 43 pharmacies, 2016-2019



Source: 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid

If pharmacies incur a cost to operate of \$10 per prescription dispensed, as calculated by Massachusetts via its own reimbursement formula and cost to dispense survey, reimbursements by Massachusetts' MCOs in this view are 70% underfunded in 2019. This may explain pharmacists' reported struggles to safely operate, as very few cost-saving measures exist that could be implemented to make up such a significant lack of funding.<sup>33</sup>

While this view is helpful for understanding aggregate claim differences, it is complicated by the fact that the underlying drug mix between FFS and MCO programs is not the same. To account for this, we returned to the CMS SDUD database and analyzed all generic drug utilization to identify the top 20 oral solid generic drugs dispensed by number of prescriptions within Massachusetts Medicaid across both FFS and MCO programs in 2018 (chosen because it represents the last complete year of data in the SDUD database). **Table 4-2** provides some high-level details about Massachusetts Medicaid data for these top 20 generic drugs.

**Table 4-2: Top 20 Generic Oral Solid Drugs in Massachusetts Medicaid according to CMS SDUD, 2018**

Product Name	Total Medicaid Expenditures	% of All Generic Oral Solid Expenditures	Total Number of Rxs	% of All Generic Oral Solid Rxs
Omeprazole Oral Capsule Delayed Release 20 MG	\$1,720,239	1.11%	301,523	2.78%
Loratadine Oral Tablet 10 MG	\$1,389,814	0.90%	197,960	1.83%
Cetirizine HCl Oral Tablet 10 MG	\$1,425,321	0.92%	151,193	1.39%
cloNIDine HCl Oral Tablet 0.1 MG	\$774,575	0.50%	143,123	1.32%
Ibuprofen Oral Tablet 800 MG	\$852,858	0.55%	132,763	1.22%
Gabapentin Oral Capsule 300 MG	\$1,147,990	0.74%	125,154	1.15%
Sertraline HCl Oral Tablet 100 MG	\$700,865	0.45%	123,681	1.14%
FLUoxetine HCl Oral Capsule 20 MG	\$567,458	0.37%	118,300	1.09%
clonazepam Oral Tablet 1 MG	\$640,914	0.41%	112,449	1.04%
Ibuprofen Oral Tablet 600 MG	\$601,965	0.39%	112,115	1.03%
hydroCHLOROthiazide Oral Tablet 25 MG	\$198,855	0.13%	108,137	1.00%
Atorvastatin Calcium Oral Tablet 40 MG	\$985,597	0.64%	105,313	0.97%
traZODone HCl Oral Tablet 50 MG	\$577,644	0.37%	105,293	0.97%
Lisinopril Oral Tablet 10 MG	\$459,375	0.30%	98,968	0.91%
amLODIPine Besylate Oral Tablet 10 MG	\$540,103	0.35%	98,382	0.91%
metFORMIN HCl Oral Tablet 1000 MG	\$613,064	0.40%	96,932	0.89%
amLODIPine Besylate Oral Tablet 5 MG	\$482,675	0.31%	95,861	0.88%
metFORMIN HCl Oral Tablet 500 MG	\$549,426	0.35%	95,537	0.88%
Vitamin D (Ergocalciferol) Oral Capsule 1.25 MG (50000 UT)	\$326,708	0.21%	95,536	0.88%
Gabapentin Oral Tablet 800 MG	\$1,680,056	1.08%	89,716	0.83%

*Source: CMS SDUD, Massachusetts, 2018*

These 20 products represent over 1 in 5 of the oral generic medications dispensed (23.1%) and 1 in 10 of the dollars spent (10.5%) by Massachusetts Medicaid on all oral generic medications in 2018.

With these top 20 products, we can begin to analyze how the structural differences in reimbursement between FFS and MCO programs impact pharmacy providers. For each drug, we will demonstrate the average amount of reimbursement provided per prescription from the PBM/payer (i.e., ingredient cost + dispensing fee), the average copayment collected per prescription, and the average acquisition cost per prescription based upon NADAC. We will display acquisition cost as a negative number and the payments as positive numbers so we can visualize how payment sources compare to costs. By comparing the payments collected to the acquisition cost, we can compare Margin over NADAC for the same set of drugs between FFS programs and MCOs in the same time frame.

In **Figure 4-9**, we can see for each of the top 20 drugs in 2019, the FFS Medicaid program provided pharmacies nearly the same amount of reimbursement over acquisition cost for each of the medications reviewed. To the degree that this margin represents an incentive for the business aspect of pharmacy to provide services to Massachusetts FFS Medicaid members, it provides an equal incentive to care for each patient and treat each condition the same.

**Figure 4-9: FFS Top 20 Generic Oral Solid Drugs, Payments vs. Acquisition Costs at 43 pharmacies, 2019**

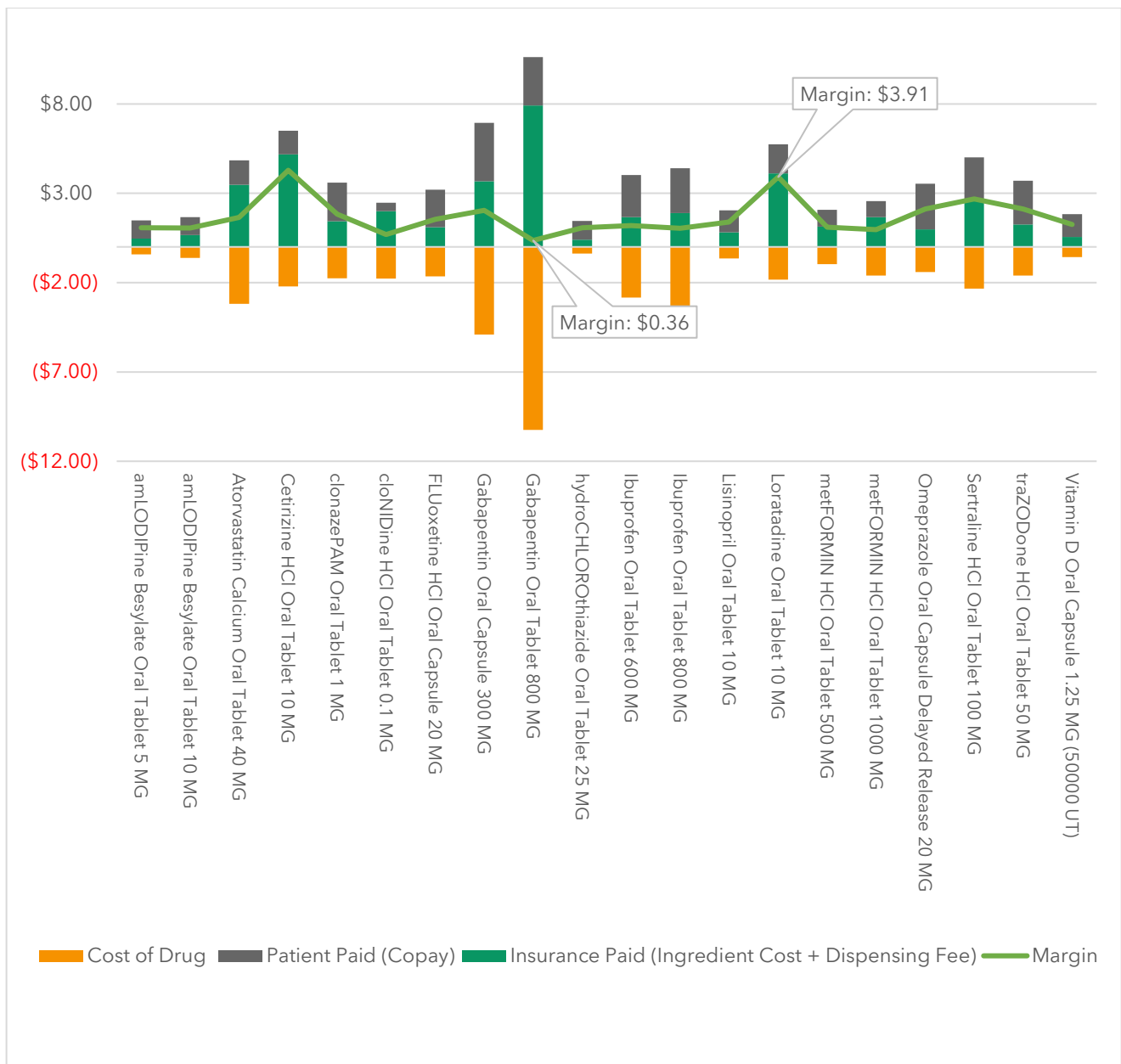


*Source: 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid*

Duplicating **Figure 4-9** for the MCOs in Massachusetts Medicaid provides a very different picture for these same 20 generics. As shown in **Figure 4-10** (on the following page) although the NADAC for each product is nearly identical between FFS and MCO, the Margin over NADAC in managed care is not a flat line like it is in the FFS chart. Rather, we see some drugs paid out at 10 times the margin of other drugs. For example, gabapentin 800mg is priced only \$0.36 above the cost to acquire the

drug, compared to loratadine 10mg, which is priced \$3.91 above its cost in MCO. From a pure business standpoint, a pharmacy would better itself financially by serving people with allergies (as this should bring more patients needing loratadine) rather than people with neurologic conditions (i.e., people needing treatment with gabapentin). If we look at cetirizine, another medication to treat allergies, we can see some confirmation of these observations, as it similarly provides a relatively **high margin** above acquisition cost (at least for drugs dispensed within MCOs) at \$4.29 per claim. We can also observe that copayments represent a larger portion of pharmacy MCO reimbursement for these 20 drugs relative to that in FFS, as the gray bars are larger in **Figure 4-10** than in **Figure 4-9**. Of note, despite this variability, MCO margins on all drugs shown in **Figure 4-10** are lower than the pharmacies' \$10.02 cost to dispense as determined by Massachusetts' cost of dispensing survey.

Figure 4-10: MCO Top 20 Generic Oral Solid Drugs, Payments vs. Acquisition Costs, 2019



Source: 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid

The stark contrast in reimbursement for the same set of drugs during the same time frame highlights the philosophical differences in reimbursement structure between the state-run FFS program and MCO programs. The FFS program covers a pharmacy's acquisition cost and pays the pharmacy a flat fee for its services. The service fee is indifferent to the drug the pharmacy is dispensing, thereby removing any financial incentive to dispense one drug over another or serve one patient over another. Conversely, pharmacy reimbursement in managed care is largely driven by the drug a pharmacy is dispensing. This provides the incentive for a pharmacy to dispense one drug over another or serve one patient over another. With aggregate pharmacy margins so far below operating cost, a pharmacy simply must get its fair share of drugs that are priced in a vastly inflated manner relative to cost to subsidize the lower margin drugs. In short, MCOs have introduced drug mix as a key uncontrollable economic variable for Massachusetts pharmacies. This is the topic we will explore next.

### 4.3 EXAMPLES OF HIGH- AND LOW-MARGIN DRUGS

Because of the importance of drug mix to pharmacy operations and due to the wide ranges of reimbursement differences on individual products observed within the pharmacy claims data (see [Figures 4-9](#) and [4-10](#)), we wanted to explore the top 10 highest and lowest margin generic oral solid products within 2019 according to CMS data and compare the reimbursement on these products reported by Massachusetts Medicaid to what pharmacies actually received.

To begin this analysis, we first need to identify the individual products associated with what appear to be the highest and lowest generic oral solid drug margins within Massachusetts Medicaid managed care. We did this by identifying all generic oral solid drugs dispensed by Massachusetts MCOs in 2018 and comparing the aggregate amount of reimbursement provided by Medicaid on those claims to the total NADAC value of those claims.<sup>b</sup> We then ranked them from highest to lowest and selected the top and bottom 10 products. The results are shown in [Table 4-3](#) (on the next page).

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<sup>b</sup> Total NADAC was calculated as the number of units dispensed for a product times the average NADAC per unit price for the year and quarter. The product of total Medicaid amount paid minus the calculated total NADAC was divided by the number of prescriptions to determine the highest and lowest available margins in the aggregated CMS data.



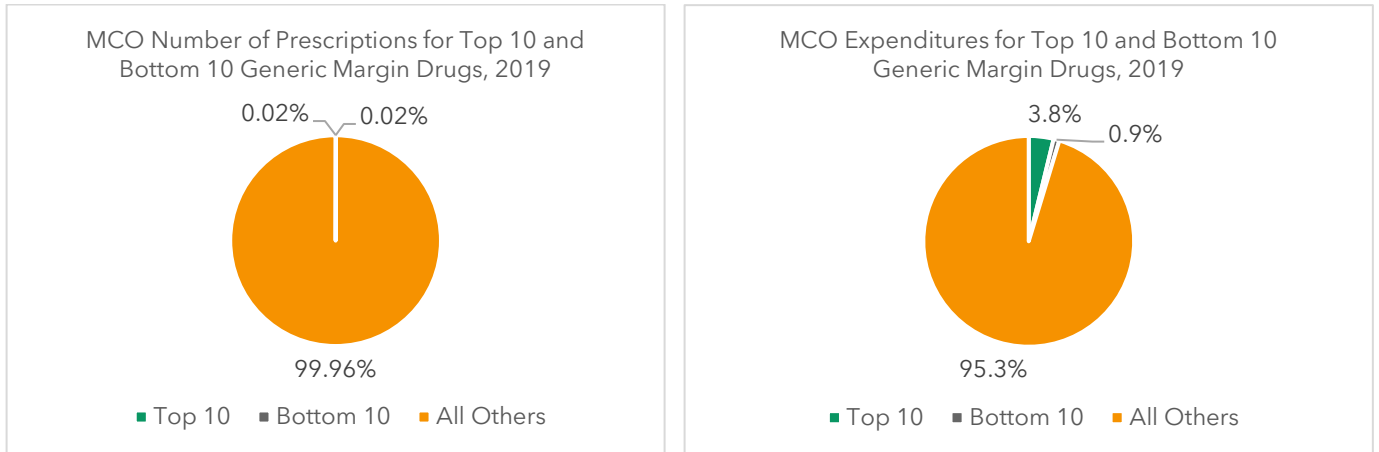
Table 4-3: Top 10 and Bottom 10 Generic Oral Solid Drugs by Margin within Massachusetts Medicaid MCO, 2019 (SDUD Data)

Top 10 Generic Margin Drugs				Bottom 10 Generic Margin Drugs			
Product Name	Avg. Medicaid Paid per Rx	Avg. NADAC per Rx	Margin over NADAC per Rx	Product Name	Avg. Medicaid Paid per Rx	Avg. NADAC per Rx	Margin over NADAC per Rx
Imatinib Tablet 400 MG	\$5,412.47	\$380.47	\$5,032.00	Clorazepate Tablet 7.5 MG	\$149.96	\$229.83	(\$79.87)
Imatinib Tablet 100 MG	\$4,299.92	\$399.30	\$3,900.62	Alosetron HCl Tablet 0.5 MG	\$603.61	\$690.49	(\$86.89)
Tadalafil Tablet 20 MG	\$2,927.27	\$750.25	\$2,177.02	Pramipexole Dihydrochloride ER Tablet 1.5 MG	\$207.75	\$310.24	(\$102.50)
metFORMIN HCl ER (MOD) Tablet 1000 MG	\$2,690.45	\$799.26	\$1,891.20	Felbamate Tablet 400 MG	\$259.27	\$385.57	(\$126.30)
Dalfampridine ER Tablet 10 MG	\$1,299.83	\$119.38	\$1,180.45	Erythromycin DR Tablet 250 MG	\$273.93	\$421.86	(\$147.93)
Capecitabine Tablet 500 MG	\$1,437.51	\$272.28	\$1,165.23	cycloSPORINE Capsule 100 MG	\$375.58	\$534.47	(\$158.89)
Sildenafil Tablet 50 MG	\$1,038.76	\$19.89	\$1,018.87	Erythromycin Base Tablet 250 MG	\$381.95	\$547.53	(\$165.58)
Rasagiline Tablet 0.5 MG	\$1,534.99	\$521.02	\$1,013.97	Mesalamine DR Tablet 800 MG	\$586.32	\$855.81	(\$269.49)
metFORMIN HCl ER (MOD) Tablet 500 MG	\$1,380.24	\$388.79	\$991.46	Lanthanum Chewable 1000 MG	\$1,030.76	\$1,343.19	(\$312.43)
Omeprazole-Sodium Bicarb Capsule 40-1100 MG	\$1,049.51	\$66.38	\$983.13	Phytonadione Tablet 5 MG	\$548.21	\$1,064.72	(\$516.52)

Source: CMS SDUD, Massachusetts

We then wanted to understand how much generic oral solid utilization and expenditures were represented by these products in 2019. As can be seen in [Figure 4-11](#) (on the next page), both groups of drugs constitute a similar portion of generic drug utilization, albeit a very small portion. Despite the similar level of utilization, the higher margin claims represent a much larger portion of generic drug expenditures in 2019.

Figure 4-11: Massachusetts Medicaid Top 10 and Bottom 10 Percent of Utilization and Expenditures of Generic Oral Solid Drugs, 2019



Source: CMS SDUD, Massachusetts

Equipped with these identified products, we then compared how the aggregate Medicaid experience compared to that of our 43 pharmacies by reproducing [Table 4-3](#) with the claims data of our pharmacies (as shown in [Table 4-4](#) on the next page). We found that the pharmacies in our study are more exposed to the low-margin claims; however, they do not have any fills for the majority of high-margin claims despite both the high- and low-margin claims representing an equal amount of the aggregate Medicaid generic oral solid utilization. As [Table 4-4](#) demonstrates, only 2 out of the 10 top generic margin claims are represented, compared to 4 out of 10 of the bottom generic margin claims. This disparity in utilization could signal [specialty pharmacy](#) “steering,” whereby the MCO or PBM limits the ability to dispense select medications and drives prescriptions for those select medications to PBM- or plan-[affiliated pharmacies](#).

**Table 4-4: Top 10 and Bottom 10 Generic Oral Solid Drugs by Margin within Massachusetts Medicaid MCO, 2019  
(Pharmacy Claims Data)**

Top 10 Generic Margin Drugs				Bottom 10 Generic Margin Drugs			
Product Name	Avg. Medicaid Paid per Rx	Avg. NADAC per Rx	Margin over NADAC per Rx	Product Name	Avg. Medicaid Paid per Rx	Avg. NADAC per Rx	Margin over NADAC per Rx
Imatinib Tablet 400 MG	-	-	-	Clorazepate Tablet 7.5 MG	\$198.29	\$215.83	(\$17.54)
Imatinib Tablet 100 MG	-	-	-	Alosetron HCl Tablet 0.5 MG	-	-	-
Tadalafil Tablet 20 MG	-	-	-	Pramipexole Dihydrochloride ER Tablet 1.5 MG	-	-	-
metFORMIN HCl ER (MOD) Tablet 1000 MG	\$1,946.48	\$486.66	\$1,459.82	Felbamate Tablet 400 MG	\$315.09	\$457.16	(\$142.07)
Dalfampridine ER Tablet 10 MG	-	-	-	Erythromycin DR Tablet 250 MG	-	-	-
Capecitabine Tablet 500 MG	-	-	-	cycloSPORINE Capsule 100 MG	\$3.65	\$455.36	(\$451.71)
Sildenafil Tablet 50 MG	\$11.41	\$53.04	(\$41.63)	Erythromycin Base Tablet 250 MG	-	-	-
Rasagiline Tablet 0.5 MG	-	-	-	Mesalamine DR Tablet 800 MG	\$806.15	\$857.14	(\$50.99)
metFORMIN HCl ER (MOD) Tablet 500 MG	-	-	-	Lanthanum Chewable 1000 MG	-	-	-
Omeprazole-Sodium Bicarb Capsule 40-1100 MG	-	-	-	Phytonadione Tablet 5 MG	-	-	-

*Source: 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid Managed Care*

Perhaps the most interesting observation from **Table 4-4** is in regard to Sildenafil Tablet 50mg. Sildenafil is a medication that was marketed under two different brand names: Revatio, which is used to treat pulmonary arterial hypertension (PAH) at a dose of 10mg to 20mg three times a day, and Viagra, which is used to treat erectile dysfunction (ED) at a dose of 25mg to 100mg once per day. It is important to note that federal Medicaid drug coverage rules allow for using sildenafil to treat PAH but do not allow for the coverage and payment of sildenafil to treat ED. Therefore, the first consideration with sildenafil 50mg is the appropriateness of payment under Massachusetts Medicaid MCOs for this agent given it does not appear to meet the definition of an appropriate covered drug in Medicaid per Section 1927 of the Social Security Act.<sup>34</sup> Note that the drug manufacturer did not feel there was additional benefit or a dose-response relationship (where increasing the dose provides improved therapeutic efficacy) for sildenafil for PAH when it reported its findings to the

FDA, although there was clear evidence of larger doses being associated with more side effects.<sup>35</sup> Secondly, Massachusetts Medicaid managed care experience with Sildenafil 50mg was associated with a significant positive margin above acquisition cost in the aggregate. As seen in [Table 4-3](#) (on page 24, the average margin was over \$1,000 per prescription; however, in the 43 pharmacies in our study, the average margin was a loss, not a profit, of \$41.63 per prescription. What could possibly explain this observation? To help answer this, we must investigate [specialty drugs](#) and specialty pharmacy steering.

## 4.4 SPECIALTY PHARMACY STEERING

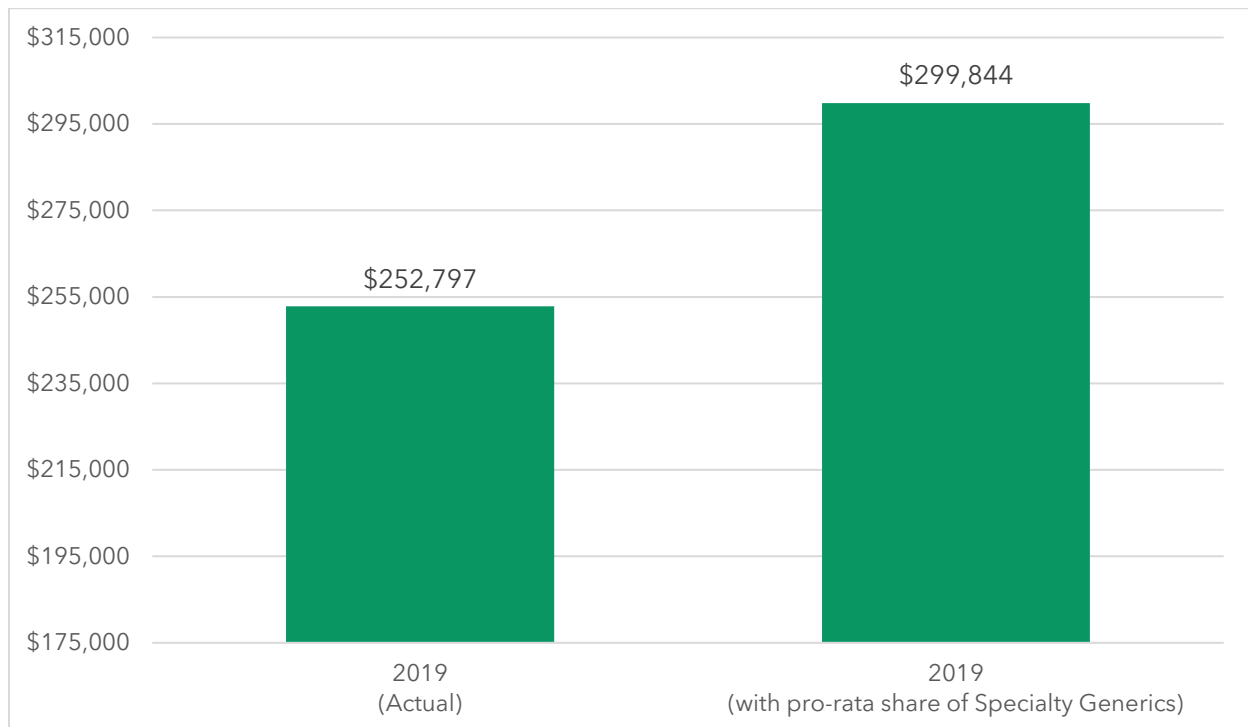
Chain and independent pharmacies do not generate the same margins over their drug acquisition costs as specialty pharmacies.<sup>36</sup> Specialty pharmacies affiliated with, and/or owned by, health plans or PBMs typically generate significantly more per claim than traditional retail pharmacies. For example, when we investigated specialty pharmacy steering in Florida managed care using data obtained through a public records request, the data showed MCO/PBM-affiliated pharmacies making 18 times to 109 times more profit over the cost of the drugs than the typical community pharmacy.<sup>37</sup> We suspect that an explanation for the sildenafil observation in Massachusetts Medicaid might be found in specialty pharmaceuticals. According to the American Academy of Actuaries, specialty pharmaceuticals are a primary driver of prescription drug costs.<sup>38</sup> Given specialty pharmaceuticals' role in cost, it is logical to conclude that MCOs and their PBM partners would like to manage these claims "in-house" via these affiliated relationships to ideally better control costs and manage outcomes.

As a result, we wanted to analyze the ability of plans to control pharmacy costs for prescription drugs within their preferred specialty pharmacies for this group of medications, particularly as plans that own the specialty pharmacy may have a significant conflict of interest. Unfortunately, the pharmacy industry lacks a universally accepted definition of a "specialty drug" outside of recognizing that they are just generally recognized as high cost. Other characteristics that are often considered when defining a specialty drug are the disease state that the product is used to treat, complexity of dosing regimen for the medication, route of administration, and ongoing monitoring (i.e., lab work) required to be safely used. We lack claim-level detail for pharmacy transactions directly from Massachusetts Medicaid, a necessary level of detail to directly evaluate specialty steering on a claim level within any state. So we will demonstrate the role of specialty pharmacy steering by examining how the absence of select drugs (i.e., high-cost and high-margin specialty claims) can impact a pharmacy's profitability.

To do this, we took the list of the top 10 generic products in terms of margin above NADAC within Massachusetts' aggregate state Medicaid data per CMS (see [Table 5-4](#) on the previous page) and altered our view of those claims. Although these claims represent just 0.02% of generic oral solid utilization and 3% of generic solid expenditures, they represent 7% of all available generic oral solid margin in 2019, according to CMS SDUD data (\$1.8 million out of \$24.7 million). As demonstrated in [Table 5-4](#), our 43 pharmacies, which compose 23% of the independent pharmacies and 4% of the overall retail pharmacies in Massachusetts, do not appear to have equivalent access to these medications given the number of missing values (due to not dispensing the claims) in the table.<sup>39</sup> Furthermore, there is no guarantee that when they do have access, they are recognizing the same level of profitability per claim as the aggregate pharmacy experience (see the sildenafil 50mg example on the previous page).

We wondered what the experience of our pharmacies would look like in terms of profitability if we were to inject into their claims history a proportional share of these top 10 generic drugs at the payment rates reflected in CMS SDUD. To make this demonstration as simple as possible, all other aspects of their claim history are left unchanged. This example would therefore represent new volume that is being added to the existing MCO claim experience, including leaving the existing Metformin HCl ER (MOD) Tablet 1000 MG and Sildenafil Tablet 50 MG prescriptions untouched at their current margins (see [Table 4-4](#) on page 26). Ultimately, a 0.02% additional utilization boost (about 20 additional prescriptions), weighted and distributed according to the top 10 generic medications from [Table 4-3](#) (on page 24) at the aggregate average price, yields an increase in the operating margin for these 43 independent and small chain pharmacies by 19%, as shown in [Figure 4-12](#).

**Figure 4-12: Generic Oral Solid Margin for 43 Pharmacies in Massachusetts Medicaid MCO, Actual vs. Access to Specialty Generics**



*Source: CMS SDUD, Massachusetts; and 43 Massachusetts Independent and Small Chain Pharmacies Claim History for Massachusetts Medicaid*

In our work in Massachusetts and other states, we have consistently seen how relatively small utilization or pricing distortions can lead to significant challenges to Medicaid programs. If we turn the example in [Figure 4-12](#) around and instead analyze the savings Medicaid could realize, rather than the gains a pharmacy could achieve, if every claim for sildenafil 50mg was paid at the rate seen at our 43 pharmacies, Massachusetts Medicaid would save \$1,027.35 per prescription (a 99% savings). While that purchasing power within the supply chain is variable, we strongly doubt that it is variable to the degree this one example highlights.

To be clear, we have not definitively proven with this demonstration alone that Massachusetts Medicaid has a specialty pharmacy steering problem. We have only observed the influence that the absence of a very few claims from a pharmacy's drug mix can have on its overall profitability when margin is dependent upon drug mix. It is telling that 0.02% change in utilization could increase overall pharmacy generic drug margins by almost 20%. This in turn demonstrates the important role

PBMs have within Massachusetts Medicaid based upon their price setting, formulary, and pharmacy network functions. If a PBM sets a price for a drug high and does not ensure that all providers have equal access to dispense such drugs, it creates an unfair advantage for its affiliated pharmacies at the expense of unaffiliated Massachusetts Medicaid pharmacy providers. This may explain why states like Ohio have moved to curb the practice of specialty pharmacy steering.<sup>40</sup>

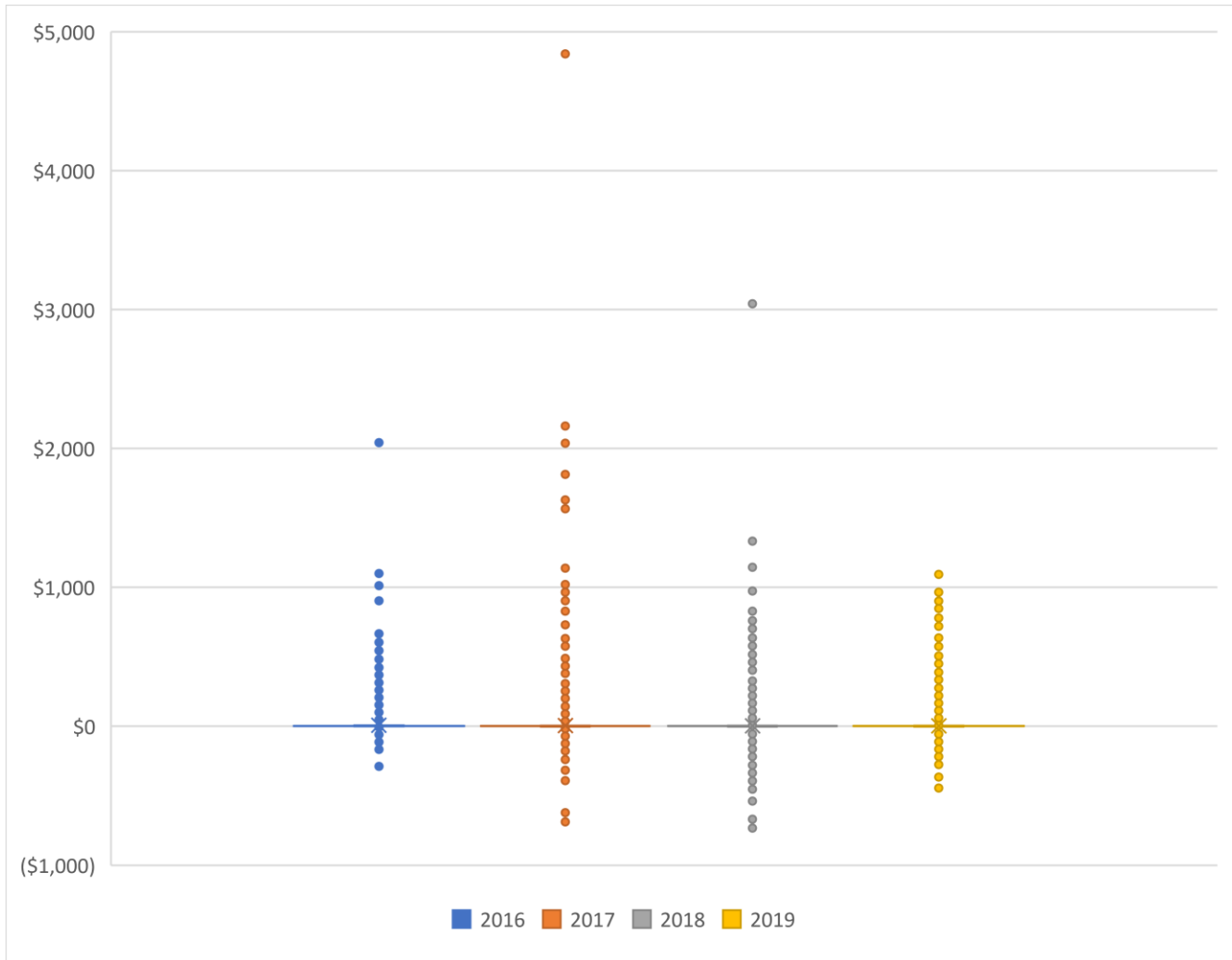
## 4.5 LOWER OF REIMBURSEMENT

To explore the role of PBM price-setting functions a little further, we next analyzed the role of the prevailing reimbursement structures employed by PBMs. All payments made between a PBM and pharmacy are predicated on the PBM paying the lesser of the pharmacy's **usual and customary (U&C)** or submitted charge (i.e., cash price) and the calculated allowable rate set by the PBM for the drug (i.e., NADAC + a Professional Dispensing Fee or MAC rate + dispensing fee). This idea of reimbursing the lower amount is referred to as "**lower of reimbursement**" and is also found within the reimbursement structure of state-run Medicaid FFS programs. While this is undoubtedly an important aspect of pharmacy claims processing—as some pharmacies offer some \$4 or free prescription medications (though increasingly rarely)—this creates an incentive for pharmacies to charge arbitrarily high amounts for cash-paying customers. Because reimbursement for the ingredient cost set by payers and submitted costs from the pharmacy for a drug are not required to be based upon the AAC the pharmacy incurred to acquire the drug, there is no incentive to provide a "real" price within the U&C or cash amounts.

The arbitrary pricing employed related to prescription drug pricing by PBMs incentivizes high "cash" prices such that, if the PBM is willing to provide higher reimbursement, the pharmacy will need to seek out these higher reimbursements via elevated U&C charges, particularly to offset losses on other prescriptions due to the self-professed arbitrary nature of MAC-based payments. Recall that according to AMCP, "MAC pricing is based on aggregating data, and so pharmacies naturally make more profit on some drugs but may not recognize a profit on every drug" and "in limited instances, may lose money on that specific purchase."<sup>41</sup> To simplify, a PBM has tremendous latitude to overpay or underpay pharmacies for specific prescription drug claims. Because a pharmacy's reimbursement is typically determined using "lower of" methodologies that include the pharmacy's submitted U&C price, if a pharmacy were to lower their cash prices they would be losing out on the arbitrary high-margin prescriptions that could offset the losses from other prescriptions. Because of the way PBMs set the incentives in their pharmacy contracts, a pharmacy is financially punished for lowering its cash prices.

To demonstrate the outcome of lower of-based reimbursement not predicated on actual acquisition costs (i.e., NADAC), we placed each oral solid generic prescription dispensed within managed care for our 43 surveyed pharmacies as a dot on a graph, with the vertical axis representing the Margin over NADAC and the horizontal axis representing the year the medication was dispensed. As can be seen in **Figure 4-13** on the following page, there is significant variability in per-claim pharmacy margin within managed care. The lowest observed reimbursement is a 2018 claim at **\$732.35 below the drug's acquisition cost (NADAC)**. The highest observed reimbursement is a 2017 claim at **\$4,883.84 above the drug's acquisition cost**. This view helps us visualize the idea that, within managed care, some claims are highly reimbursed or incentivized by the PBM, while others are reimbursed poorly or disincentivized by the PBM. **Ultimately, the success of a pharmacy's business operations is predicated on its ability to control their drug mix to favor the highly reimbursed claims over the lower reimbursed claims.**

Figure 4-13: Massachusetts Medicaid MCO Margin over NADAC (per Claim) for Generic Oral Solids, 2016-2019

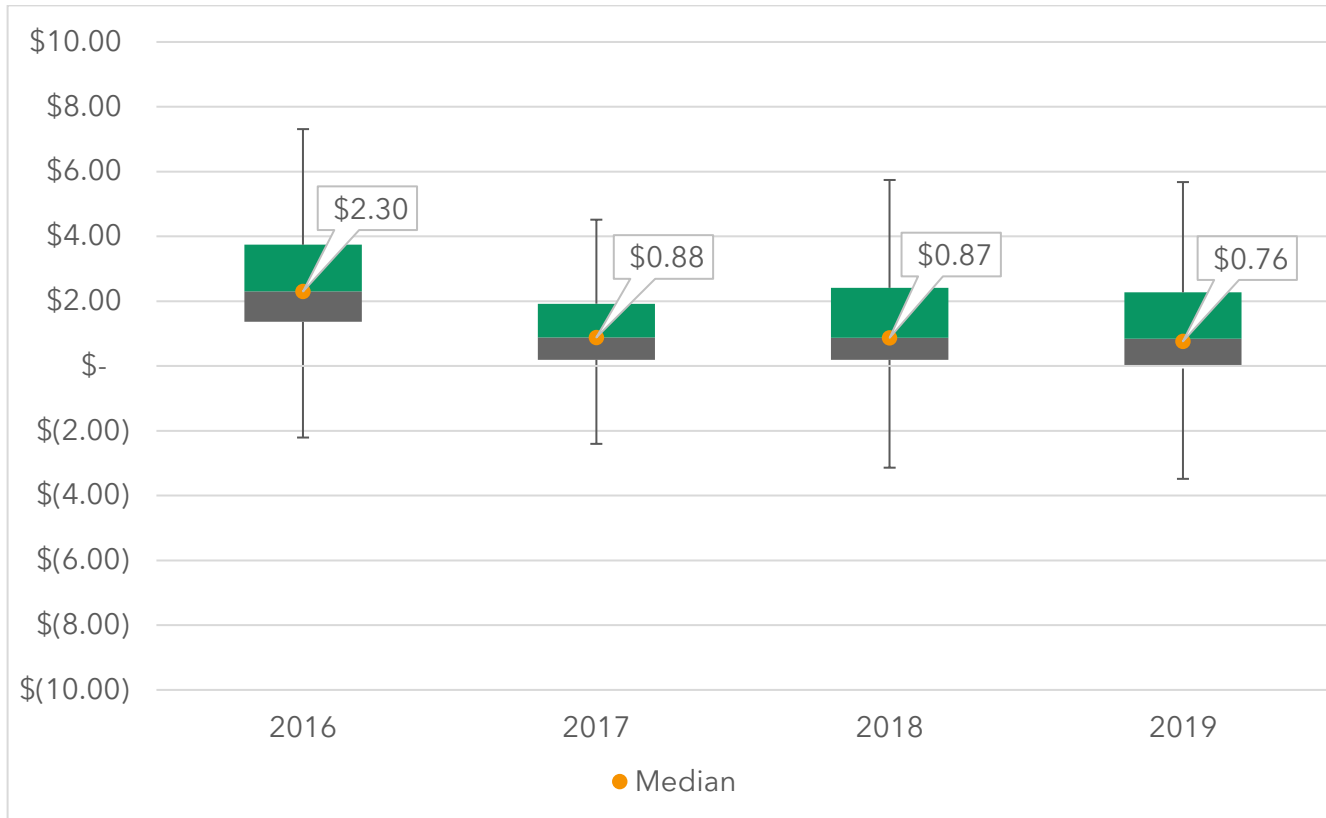


Source: 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid

The variability in a pharmacy's reimbursements relative to its acquisition costs can make identifying trends difficult. To address this, we took the above data and put it into a zoomed-in box-whisker plot. A box-whisker plot is a standardized way to display basic statistical information about a data set based upon a five-number summary of the minimum (lowest datapoint excluding outliers), maximum (largest datapoint excluding outliers), median, first (lower) quartile, and third (upper) quartile. While our data set has a great number of outliers (those outside 1.5 times the interquartile range between the lower and upper quartile, and therefore not displayed within the box plot), this view is useful to understand how the trend in reimbursements has changed over time. As can be seen in [Figure 4-14](#) on the following page, the median Margin over NADAC has trended from a high of \$2.30 in 2016 to just \$0.76 in 2019. As this trend has progressed, a larger portion of the lower quartile of claims (in gray) is near the \$0 margin, highlighting the greater number of claims that are "[underwater](#)."



Figure 4-14: Margin over NADAC Box Plot for Massachusetts MCO Oral Solid Generics, 2016–2019<sup>c</sup>



Source: 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid

#### 4.5.1 Pharmacy "Underwater Claims"

Another way to analyze pharmacy reimbursement is by looking at the percentage of claims that paid below pharmacy acquisition cost (before a pharmacy's wholesaler [rebates](#)), also known as "underwater claims." To explore these observations, we grouped claims based upon the margin the claim provided relative to its acquisition costs. Claims were grouped based upon reimbursement as follows:

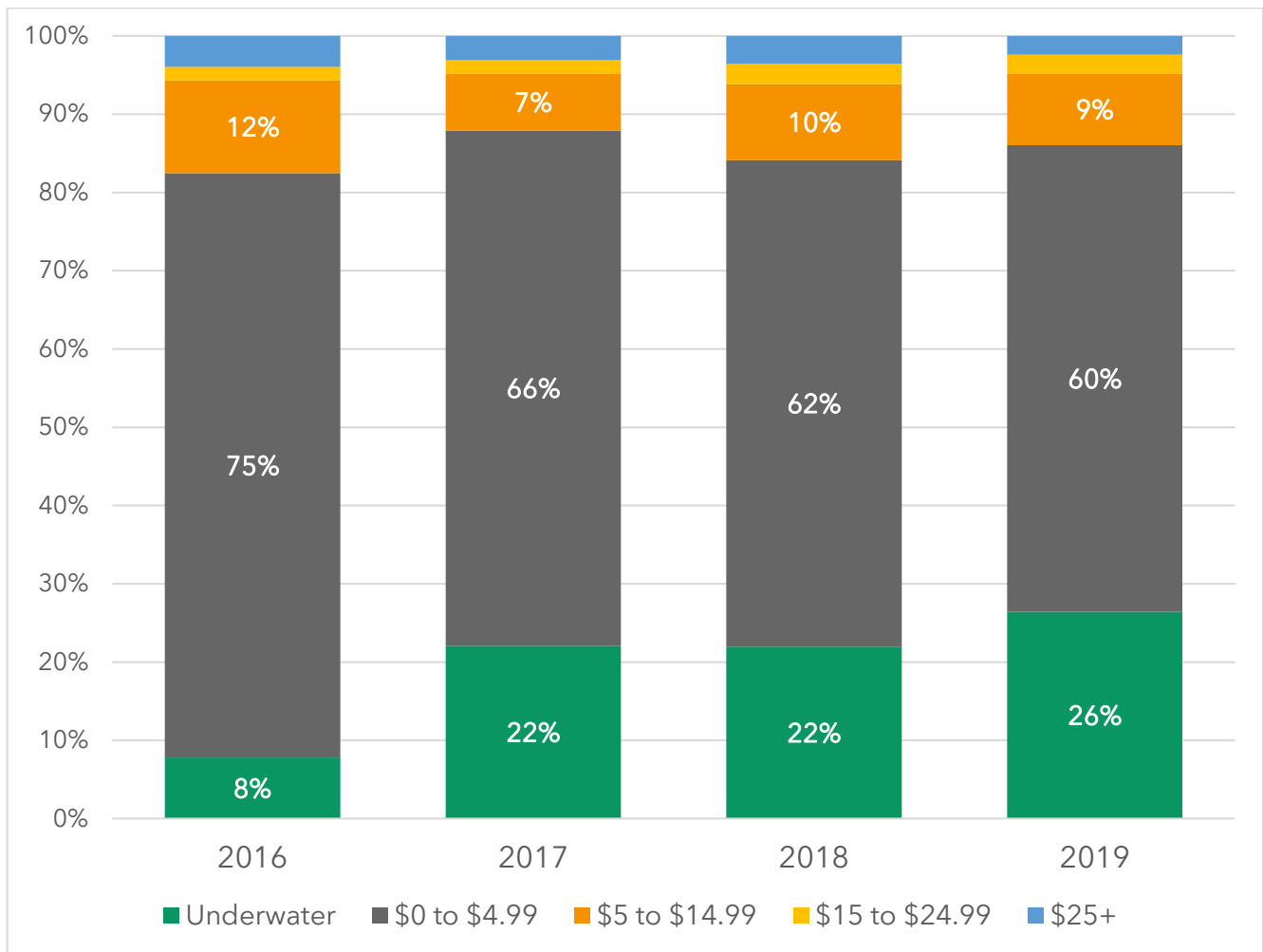
- Margin was less than \$0 (pharmacy did not receive sufficient payment to cover the drug's NADAC)
- Margin was between \$0 and \$4.99 (reimbursement less than half of retail pharmacy operating costs)
- Margin was between \$5 and \$14.99 (reimbursement "in range" of pharmacy operating costs)
- Margin was between \$15 and \$24.99 (reimbursement above retail pharmacy operating costs)
- Margin was greater than \$25 (reimbursement significantly above retail pharmacy operating costs)

As can be seen in [Figure 4-15](#) on the following page, the number of underwater generic oral solid managed care claims has grown by more than three times, from a low of 8% of claims in 2016 to 26%

<sup>c</sup> Note that Figure 5-14 does not display outlier values, defined as those outside 1.5 times the interquartile range (IQR), to aid in visualization. Outlier values can be assessed in Figure 5-13. The outlier data is included to develop the box plot (i.e., derive the median).

of claims in 2019. The growth in these underwater claims can help explain the decrease in median reimbursements presented in [Figure 4-14](#) on the previous page.

**Figure 4-15: Massachusetts MCO Oral Solid Generic Claim Margin Groupings, 2016-2019**



*Source: 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid*

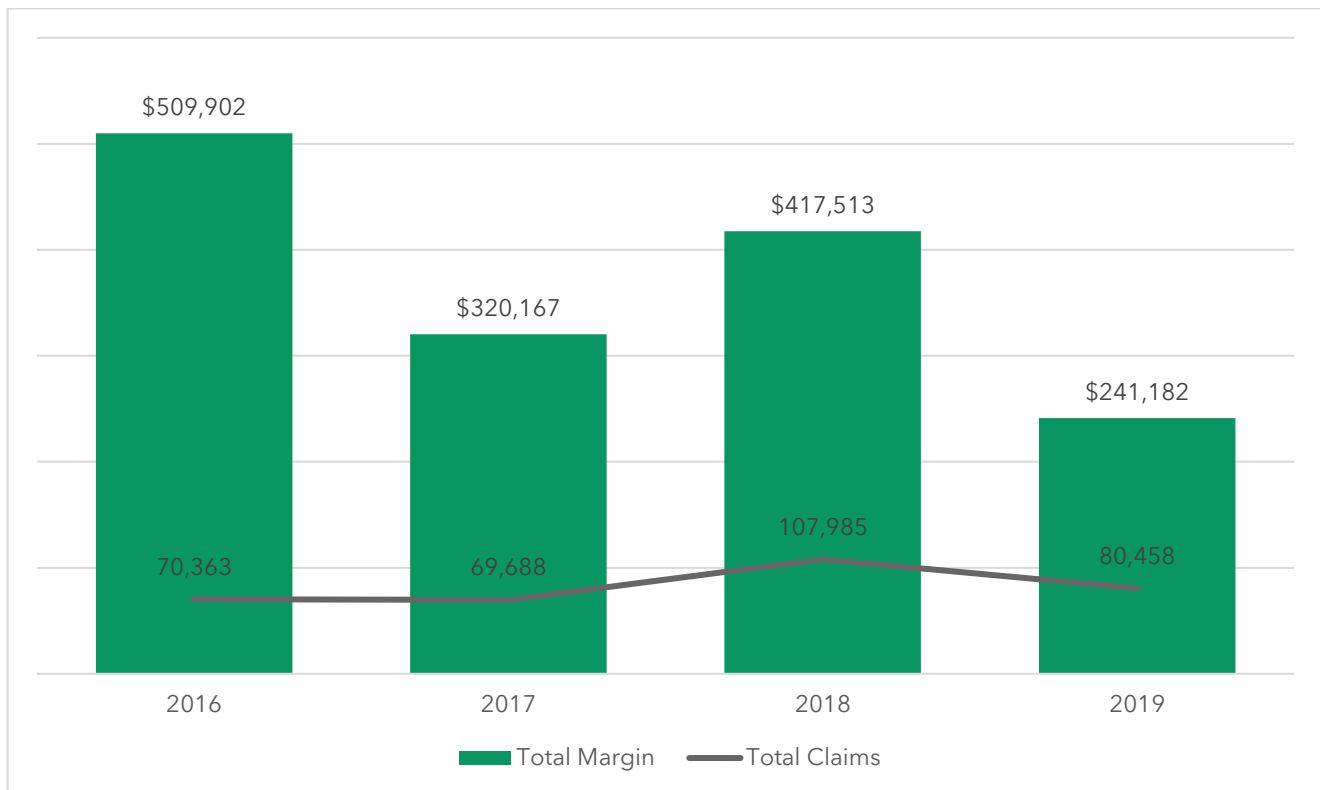
The number of claims significantly above operating cost (i.e., \$15 or more in margin) has remained flat at 5% to 6% of claim volume from 2016 through 2019. Similarly, the number of claims in range of operating cost (i.e., \$5 to \$14.99) has remained between 9% and 12%. These findings highlight that the growth in underwater claims is coming principally from the already low-margin \$0-to-\$4.99 group of claims. This demonstrates a principal complaint of pharmacies: the growth in poorly reimbursed claims as they are challenged to deliver lower costs on claims already paying below operating costs.

Understanding that there is a growth in underwater pharmacy reimbursements is critical to understanding why cash and U&C prices at pharmacies have remained high. As these underwater claims represent an increasing portion of their business, pharmacies become increasingly dependent upon the highly reimbursed claims (those above \$15 margin) to generate a sustainable overall margin. By examining the highest reimbursed generic drugs, we can demonstrate the importance of these claims to pharmacy business operations.

#### 4.5.2 Removing High Reimbursements

The 43 pharmacies included in this study collectively received \$1.5 million in Margin over NADAC on generic oral solid prescriptions dispensed within Massachusetts Medicaid managed care between 2016 and 2019. In [Figure 4-16](#) on the following page, we graphed the generic oral solid Margin over NADAC for each year in Massachusetts managed care along with the number of claims. We observe that generic oral solid margin went from \$509,000 in 2016 to \$241,000 in 2019. The decline in margin of 53% occurs despite there being 14% more oral solid generic claims dispensed in 2019 compared to 2016. These observations suggest that pharmacies are currently making less per prescription despite an increasing workload over time.

Figure 4-16: Total Margin on Generic Oral Solids, 2016-2019

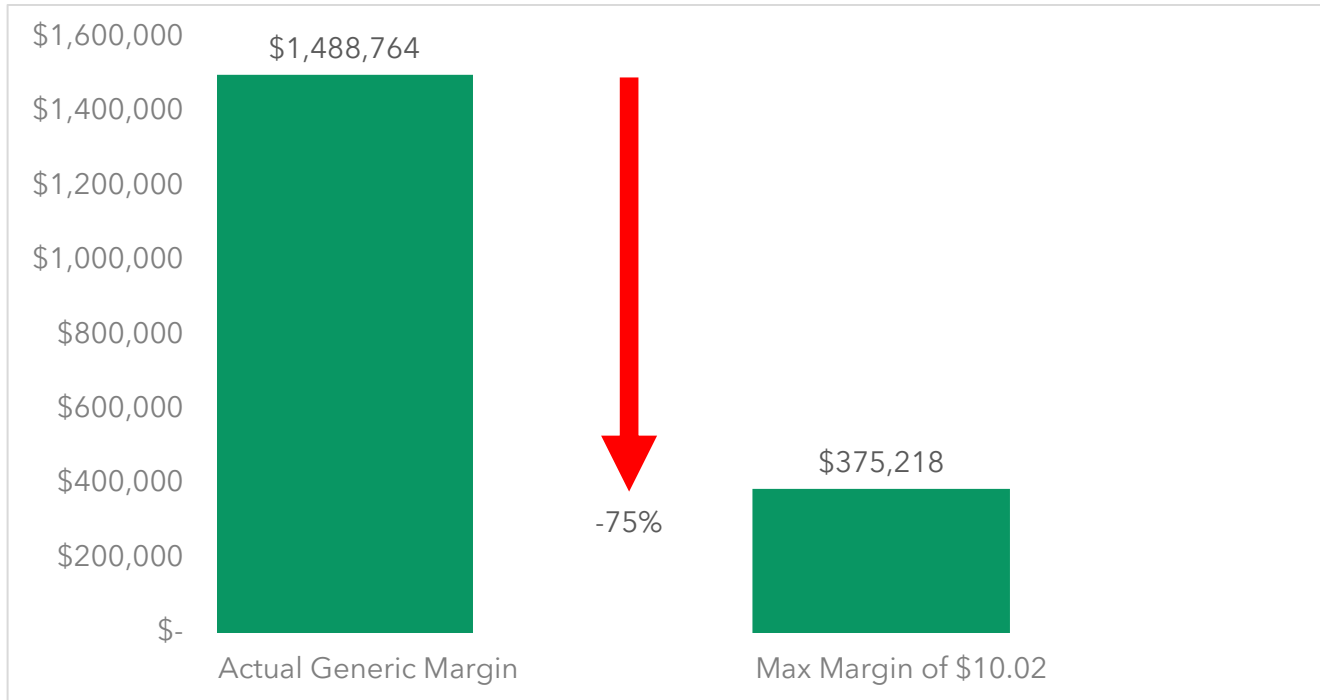


Source: 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid

By understanding that pharmacies are being financially pressured on the majority of their claim volume to a level not previously seen, we can begin to understand why pharmacies keep cash prices high for their drugs. In Massachusetts, the United Health Foundation estimates that 97.2% of people have insurance.<sup>42</sup> Because people with insurance far outnumber people paying cash, the incentive structure of PBM reimbursement methods encourages pharmacies to keep cash prices (U&C) high to avoid damaging their primary business: those people with insurance. We can demonstrate this by altering the claims data for the 43 pharmacies of our study to illustrate what would happen to pharmacy margin if all pharmacies were to submit a maximum U&C charge of \$10.02 above their acquisition cost (based on NADAC) on all their Medicaid managed care claims. This would do nothing to alter the lower reimbursed claims or underwater claims, but lower of reimbursement methodology would ensure the maximum reimbursement for all claims would be fixed at \$10.02, not the almost \$5,000 some claims reimbursed at within Massachusetts managed care (see [Figure 4-13](#) on page 30).

Altering costs in this way removes \$1.1 million in margin over the 2016 to 2019 timeframe, as the previously highly reimbursed claims were reduced to \$10.02 above costs (i.e., NADAC). **This one change reduces pharmacy margin by 75% during this period**, as seen in **Figure 4-17** on the following page.

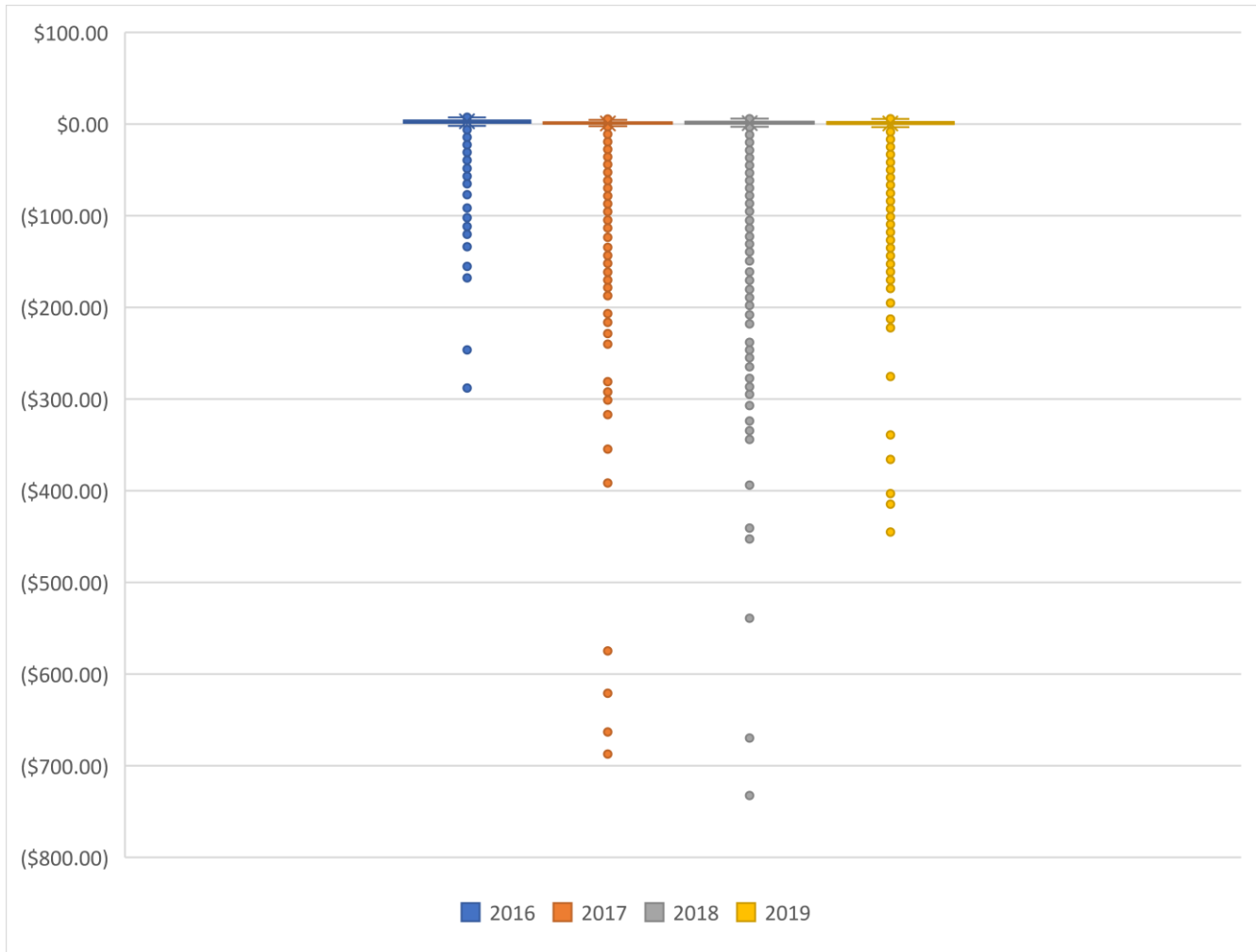
**Figure 4-17: Total Generic Oral Solid Margin in Massachusetts MCOs, Actual Experience vs. Max Margin Scenario, 2016-2019**



*Source: 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid*

As COVID-19 has demonstrated, no business can sustain a loss of 75% of its business for an extended period and remain operational. To visualize this, we reproduced **Figure 4-14** (on page 31) but converted the high-margin claims to produce no more than \$10.02 in margin (as would result in a lower of reimbursement model if these pharmacies would have submitted lower cash or U&C charges on the claims). As can be seen in **Figure 4-18** on the following page, this reduces the maximum margin potential for any claim during any year to \$10.02 (the new maximum reimbursement in **Figure 4-18**), but does nothing to alter the minimum reimbursement, with the lowest observed reimbursement remaining a 2018 claim at **\$732.35 below acquisition cost**.

Figure 4-18: Massachusetts MCO Margin over NADAC for Generic Oral Solids (Maximum Margin \$10.02), 2016-2019



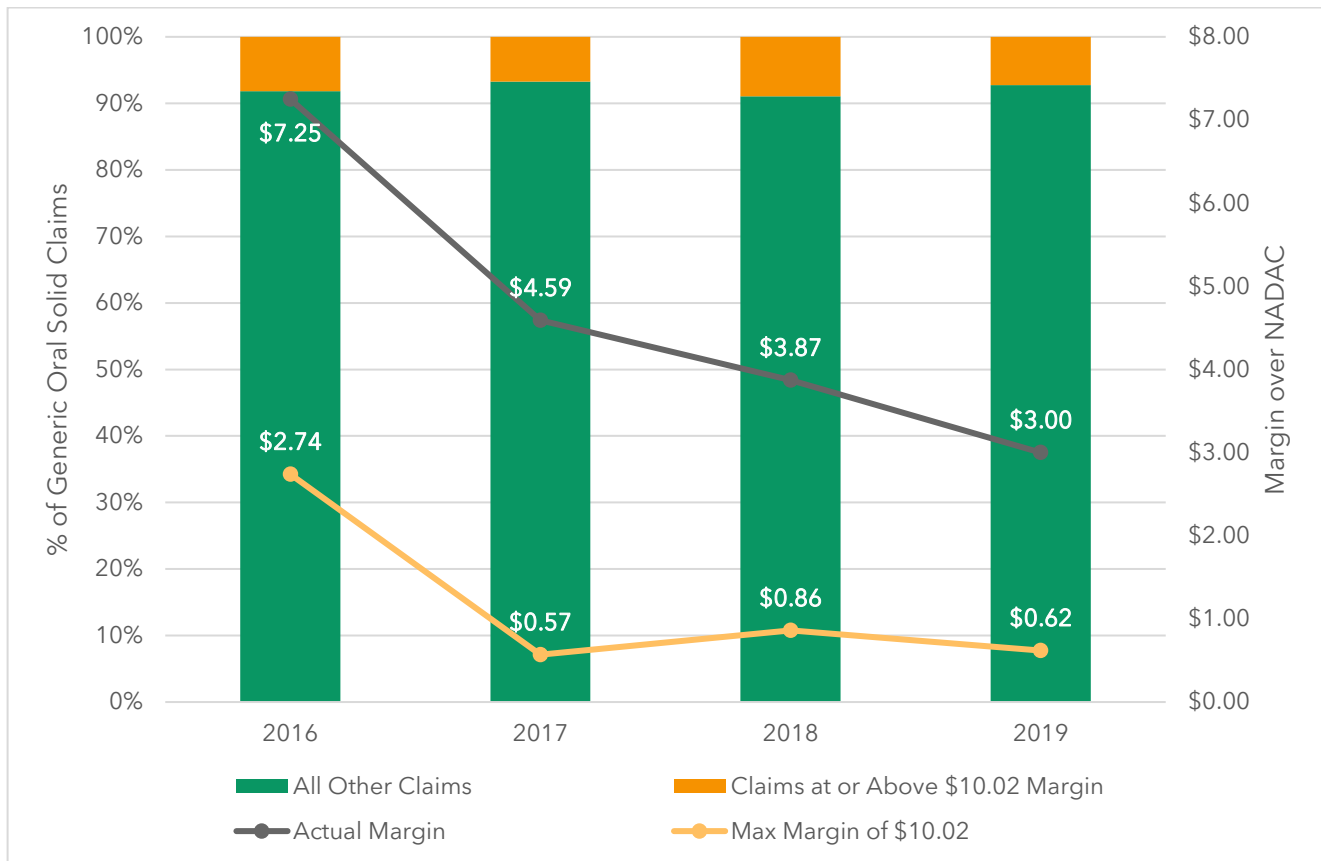
Source: 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid

Because pharmacies may be reimbursed under costs for a significant, growing number of claims, there is no incentive for them to set their U&C at the drug ingredient cost plus a \$10 dispensing fee, as it would be severely detrimental to their business operations. While this may enable them to chase additional paying customers and save health plans additional money, it wipes out the majority of their margin, which they need to sustain business operations. **If the 43 pharmacies in our study were to cut off the relatively small 7.8% of their claim volume that arbitrarily paid a margin above \$10.02 per prescription from 2016 to 2019, it would bring their overall margin down from \$4.53 to \$1.14 per prescription, a decline of 75%.** In essence, this creates a self-perpetuating system where payers need PBMs to control high list costs for drugs (i.e., U&C), but the PBM reimbursement structure fosters and encourages, rather than discourages, ever-rising U&C prices. It is important to note that the costs and trends presented here do not reflect rebates pharmacies likely receive from their wholesalers, but it is unreasonable, in our view, to expect wholesale rebate receipts to be expanding over time to make up for this shortfall.

To better conceptualize the impact of fixing margin to a maximum of \$10.02 per prescription, we decided to present the findings of [Figure 4-18](#) slightly differently. To do this, we put generic oral solid claim volume into a fixed bar graph to demonstrate the percentage of claims impacted by the margin fixing in [orange](#); we graphed the aggregate generic Margin over NADAC per prescription

over time for the generic oral solid drugs based upon actual experience in green; and we placed our modeled experience of maximum reimbursement of \$10.02 in orange in Figure 4-19. The figure shows these highly reimbursed generic oral solid claims are never a significant portion of overall generic oral solid claim volume (i.e., less than 10%), but their absence from a pharmacy's operations is severely detrimental to its business and margin. In 2019 alone, the impact would reduce generic oral solid margin from \$3 per prescription to \$0.62 per prescription.

**Figure 4-19: Per-Claim Margin over NADAC in Massachusetts MCOs for Generic Oral Solids, Actual Experience vs. Maximum Margin Scenario, 2016-2019**



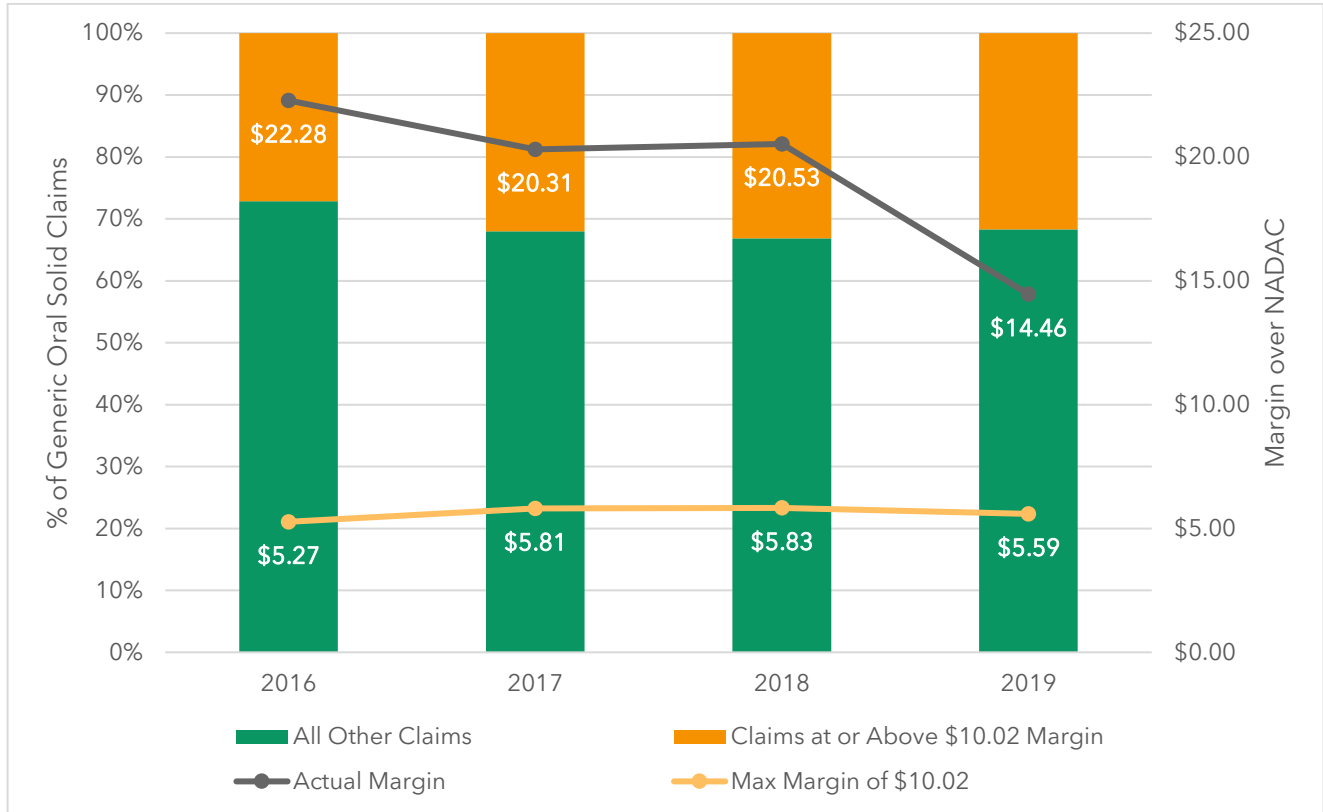
*Source: 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid*

Note that the concern raised here is not unique to Massachusetts Medicaid managed care but exists within all payers who lack a pricing methodology predicated on covering AACs and professional dispensing fees. If we expand the view of our 43 pharmacies to analyze all other payers besides Massachusetts Medicaid, we can see that the problem exists across all other payer types.<sup>d</sup> In Figure 4-20 on the following page, we see that if pharmacies were to cut off the 30% of their generic oral solid claims that arbitrarily paid a margin above \$10.02, their overall margin would fall from \$19.62 per prescription to \$5.64 per prescription, a decline of 71%, from 2016 to 2019. Note that this also suggests that Massachusetts Medicaid MCOs are a worse payer in the aggregate than other payer types (e.g., commercial, Medicare), as the per-claim numbers in Figure 4-20 for the non-Medicaid payers are higher than those in Figure 4-19. Nonetheless, high-margin claims are important regardless of payer type, as their absence has a similar effect on margin (i.e., 75% reduction in Medicaid vs. 71% in non-Medicaid payers). It is critical to note that, due to post-claims adjustments

<sup>d</sup> FFS Medicaid is excluded due to the nature of payment model, which already reimburses at actual acquisition cost plus a professional dispensing fee.

in Medicare (i.e., [Direct and Indirect Remuneration \[DIR\] fees](#)) and commercial plans (GER [true-ups](#)), the point-of-sale pharmacy profitability associated with other payers is likely meaningfully overstated.

**Figure 4-20: Per-Claim Margin over NADAC in Non-Medicaid Payers in Massachusetts for Generic Oral Solids, Actual Experience vs. Max Margin Scenario, 2016-2019**



*Source: 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid*

### 4.5.3 Arbitrary Maximum Allowable Cost Rates

Because MAC lists—which are subjectively set by PBMs as a mechanism to reimburse pharmacies for prescription drugs—result in some drugs being over-reimbursed and others under-reimbursed, there is an inherent arbitrary nature to MAC reimbursement that does not exist within other reimbursement structures, such as NADAC-based benchmarks. According to the methodology for NADAC, identical products—drugs that are therapeutically and pharmaceutically equivalent—receive the same NADAC price. In principle, this is the same function of MAC lists, which seek to encourage pharmacy providers to select the least expensive option from interchangeable drugs. However, in practice, we do not see this within the reimbursement structure of Massachusetts MCOs and their PBMs. As can be seen in [Table 4-5](#) on the following page, for the various interchangeable metformin 1,000mg products dispensed in 2018 across the 43 pharmacies in our study, the average acquisition cost for the products (using NADAC) is the same: \$0.03 per unit. However, reimbursements by Massachusetts MCOs for the products vary from \$0.03 to \$1.43 per unit. Note that this table displays only generic versions of metformin 1,000mg, those which would likely be subject to MAC-based pricing by a PBM.



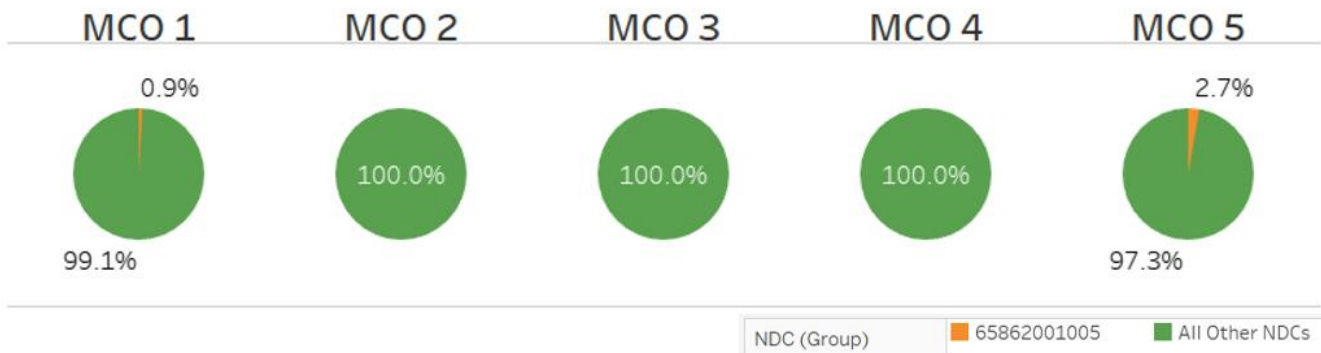
Table 4-5: Metformin 1,000mg Reimbursement by NDC for Massachusetts MCOs, 2018

	MCO 1		MCO 2		MCO 3		MCO 4		MCO 5	
PBM	PBM A		PBM A		PBM A		PBM B		PBM C	
NDC	PBM Paid per Unit	NADAC per Unit	PBM Paid per Unit	NADAC per Unit	PBM Paid per Unit	NADAC per Unit	PBM Paid per Unit	NADAC per Unit	PBM Paid per Unit	NADAC per Unit
65862001005	\$1.43 <sup>e</sup>	\$0.03							\$1.21	\$0.03
67877056305							\$0.06	\$0.03		
53746022010					\$0.05	\$0.03			\$0.09	\$0.03
00093721410	\$0.04	\$0.03	\$0.03	\$0.03	\$0.04	\$0.03			\$0.10	\$0.03
65862001099	\$0.08	\$0.03	\$0.03	\$0.03	\$0.04	\$0.03			\$0.06	\$0.03
23155010410	\$0.04	\$0.03	\$0.04	\$0.03	\$0.04	\$0.03	\$0.05	\$0.03	\$0.07	\$0.03
53746022005	\$0.03	\$0.03	\$0.04	\$0.03	\$0.04	\$0.03			\$0.07	\$0.03
23155010401					\$0.06	\$0.03				
65862001001					\$0.04	\$0.03			\$0.04	\$0.03
67877056310	\$0.04	\$0.03	\$0.05	\$0.03	\$0.04	\$0.03			\$0.04	\$0.03
23155010405	\$0.03	\$0.03	\$0.04	\$0.03	\$0.04	\$0.03			\$0.05	\$0.03
71717010611					\$0.04	\$0.03				
68382076010	\$0.03	\$0.03			\$0.04	\$0.03			\$0.04	\$0.03
61442036305					\$0.06					

Source: 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid

Despite the incentive this reimbursement may create, the 43 pharmacies within our study do not appear to be following the incentive to dispense the more lucrative 65862001005 NDC of metformin, as shown in Figure 4-21 on the following page, which identifies the number of prescriptions dispensed of each NDC across each MCO in 2018. Across the 14 NDCs, the majority of the utilization is in the lower reimbursed products compared to the highly reimbursed NDC made by Aurobindo (65862001005).

Figure 4-21: Utilization of Metformin 1000mg Products by NDC within MCOs, 2018



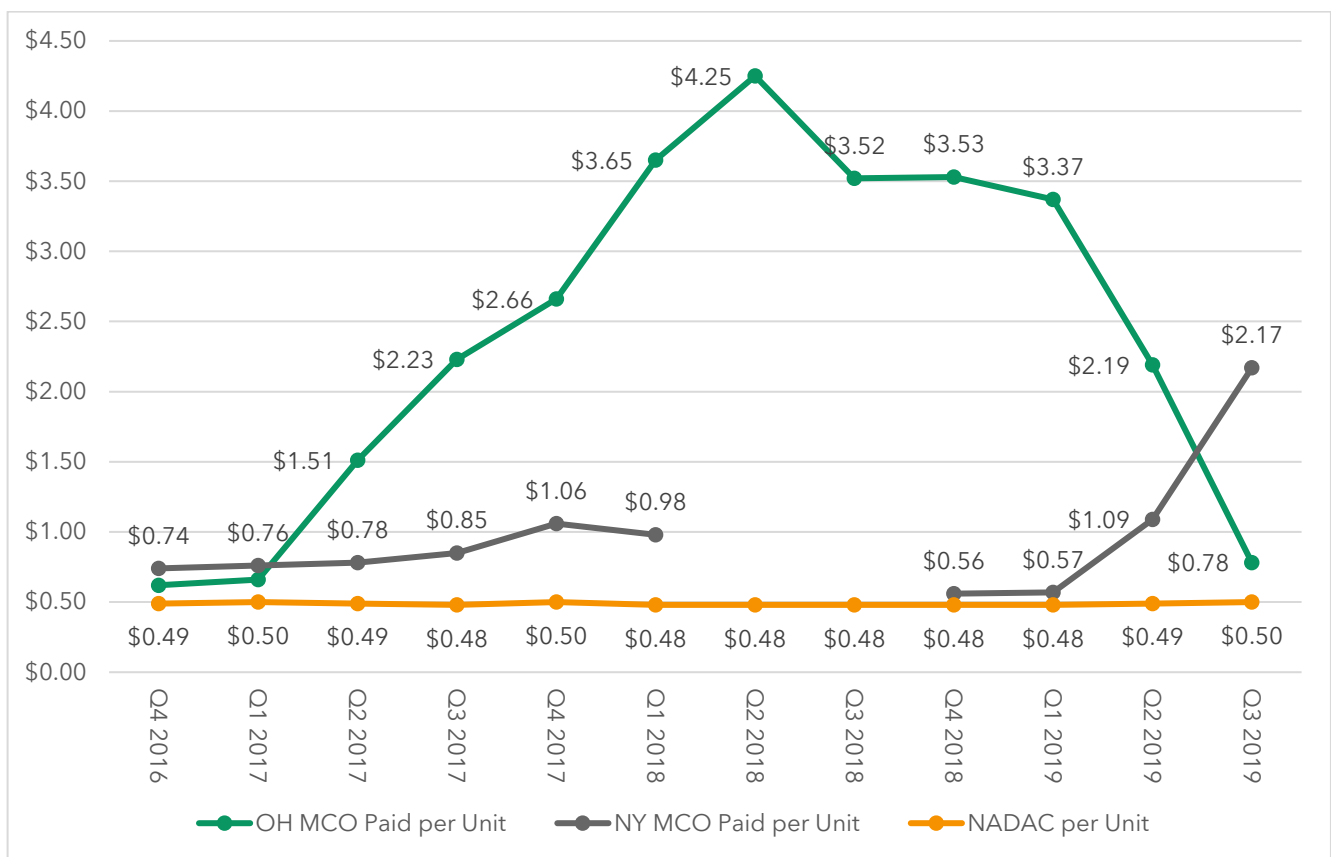
Source: 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid

However, as pharmacy business operations continue to be pressured over time, the incentive for pharmacies and their wholesalers to follow the PBM reimbursement pricing signals will grow

<sup>e</sup> Note this reimbursement is higher than AWP for the product, which was \$1.41 per unit.

stronger. In other words, pharmacies may eventually be compelled to seek out these higher reimbursed products. In other states we have analyzed, we have seen proof of pharmacies following the drug pricing signals currently provided by PBMs and health plans. Specifically, from Q4 2016 to Q2 2019, 3 Axis Advisors’ co-founders observed that another mature generic drug—omeprazole 20 mg tablets—experienced significant price increases in the Ohio Medicaid managed care program. Further research confirmed that the driver of these price increases was the shift of utilization from lower cost versions of the product into the higher priced NDCs.<sup>43</sup> As can be seen in [Figure 4-22](#) on the following page, the practice of Ohio pharmacies moving utilization to the higher reimbursed drug, despite interchangeable products being associated with lower costs, appears to have stopped following reporting by *The Columbus Dispatch* on the practice; however, it now appears to be growing in other states, such as New York.<sup>44</sup> Note that New York did not fully report Medicaid managed care utilization and costs in Q2 or Q3 2018, which explains why these two quarters are missing from the chart.

**Figure 4-22: Omeprazole 20mg MCO Payments, Ohio and New York, Q4 2016 to Q3 2019**



Source: CMS SDUD, Massachusetts

Unfortunately, the wide pricing variability with arbitrary MAC prices in Massachusetts Medicaid managed care among equally interchangeable generic drugs are not limited to this one version of metformin. Rather, they are part of the design of the state’s managed care generic drug pricing. To demonstrate this, we will return to 2018’s Top 20 generic drug list ([Table 4-3](#) on page 24) and display the per unit range of PBM reimbursements across the available NDCs and the range of NADAC prices per unit for those same NDCs for the entire year. What we find in [Table 4-7](#) on the following page is that PBM reimbursements can vary significantly, while NADAC pricing is not subject to the same variability (note that +/- \$0.01 difference is largely a rounding difference due to data aggregation). The largest range for reimbursement is \$4.65 for omeprazole 20mg products (the

same drug Ohio had and New York has pricing issues with), and the largest range for NADAC is \$0.05 for the various ibuprofen 600mg NDCs.

Table 4-6: Top 20 Generic Oral Solid Medications, PBM Paid per Unit vs. NADAC for All NDCs of the Product in 2018

Product	PBM Paid Per Unit Range for All Generic NDCs for the Product	NADAC Per Unit Range for All Generic NDCs for the Product
amLODIPine Besylate Oral Tablet 10 MG	\$0.01-\$0.12	\$0.02-\$0.03
amLODIPine Besylate Oral Tablet 5 MG	\$0.01-\$1.76	\$0.01-\$0.02
Atorvastatin Calcium Oral Tablet 40 MG	\$0.08-\$0.46	\$0.09-\$0.12
Cetirizine HCl Oral Tablet 10 MG	\$0.06-\$0.93	\$0.07-\$0.08
clonazepam Oral Tablet 1 MG	\$0.03-\$1.02	\$0.02-\$0.03
clonidine HCl Oral Tablet 0.1 MG	\$0.01-\$0.15	\$0.02-\$0.03
FLUoxetine HCl Oral Capsule 20 MG	\$0.03-\$2.71	\$0.02-\$0.03
Gabapentin Oral Capsule 300 MG	\$0.04-\$0.18	\$0.04-\$0.06
Gabapentin Oral Tablet 800 MG	\$0.06-\$0.62	\$0.12-\$0.14
hydrochlorothiazide Oral Tablet 25 MG	\$0.03-\$0.15	\$0.00-\$0.01
Ibuprofen Oral Tablet 600 MG	\$0.04-\$0.16	\$0.01-\$0.06
Ibuprofen Oral Tablet 800 MG	\$0.04-\$0.23	\$0.05-\$0.07
Lisinopril Oral Tablet 10 MG	\$0.01-\$0.41	\$0.00-\$0.02
Loratadine Oral Tablet 10 MG	\$0.05-\$0.74	\$0.06-\$0.07
metFORMIN HCl Oral Tablet 1000 MG	\$0.03-\$1.43	\$0.03
metFORMIN HCl Oral Tablet 500 MG	\$0.01-\$0.14	\$0.01-\$0.02
Omeprazole Oral Capsule Delayed Release 20 MG	\$0.04-\$4.69	\$0.04-\$0.06
Sertraline HCl Oral Tablet 100 MG	\$0.06-\$0.31	\$0.04-\$0.06
trazodone HCl Oral Tablet 50 MG	\$0.02-\$0.36	\$0.04-\$0.05
Vitamin D (Ergocalciferol) Oral Capsule 1.25 MG (50000 UT)	\$0.27-\$1.17	\$0.12-\$0.14

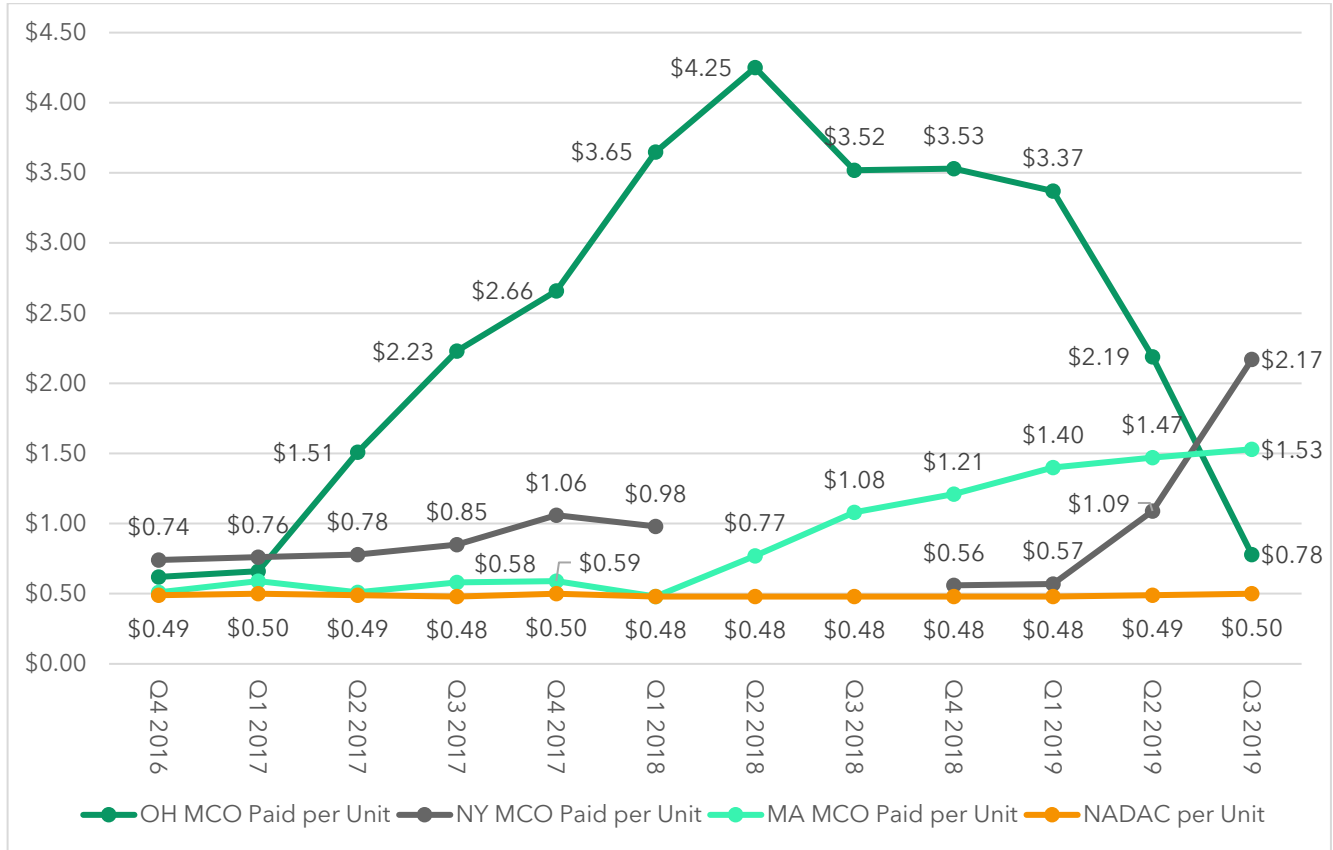
Source: 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid

Over time, pharmacy providers may more frequently come to make product selection decisions in Massachusetts based upon this incentive structure, which can create disproportionate financial windfalls for some pharmacies despite offering the same drug and same level of service as others. While over-rewarding some pharmacies, these instances of overpayments drive up the costs for programs like Massachusetts Medicaid, even in pass-through arrangements, as pharmacies distribute these products that pay well above their costs to dispense. Massachusetts taxpayers, in turn, pay the higher costs to continue to operate the Medicaid pharmacy benefit.

To give a sense of how this can occur, we wanted to revisit [Figure 4-22](#) from the previous page but include the Massachusetts MCO line, which represents aggregate Massachusetts Medicaid

managed care pharmacy claims data acquired from the CMS SDUD. As can be seen in [Figure 4-23](#) on the following page, the trend line suggests that Massachusetts pharmacies outside the 43 community pharmacies in our study may already be following such PBM-set pricing signals and seeking out higher reimbursed omeprazole 20mg products.

**Figure 4-23: Omeprazole 20mg MCO Payments, Ohio, Massachusetts, and New York, Q4 2016 to Q3 2019**

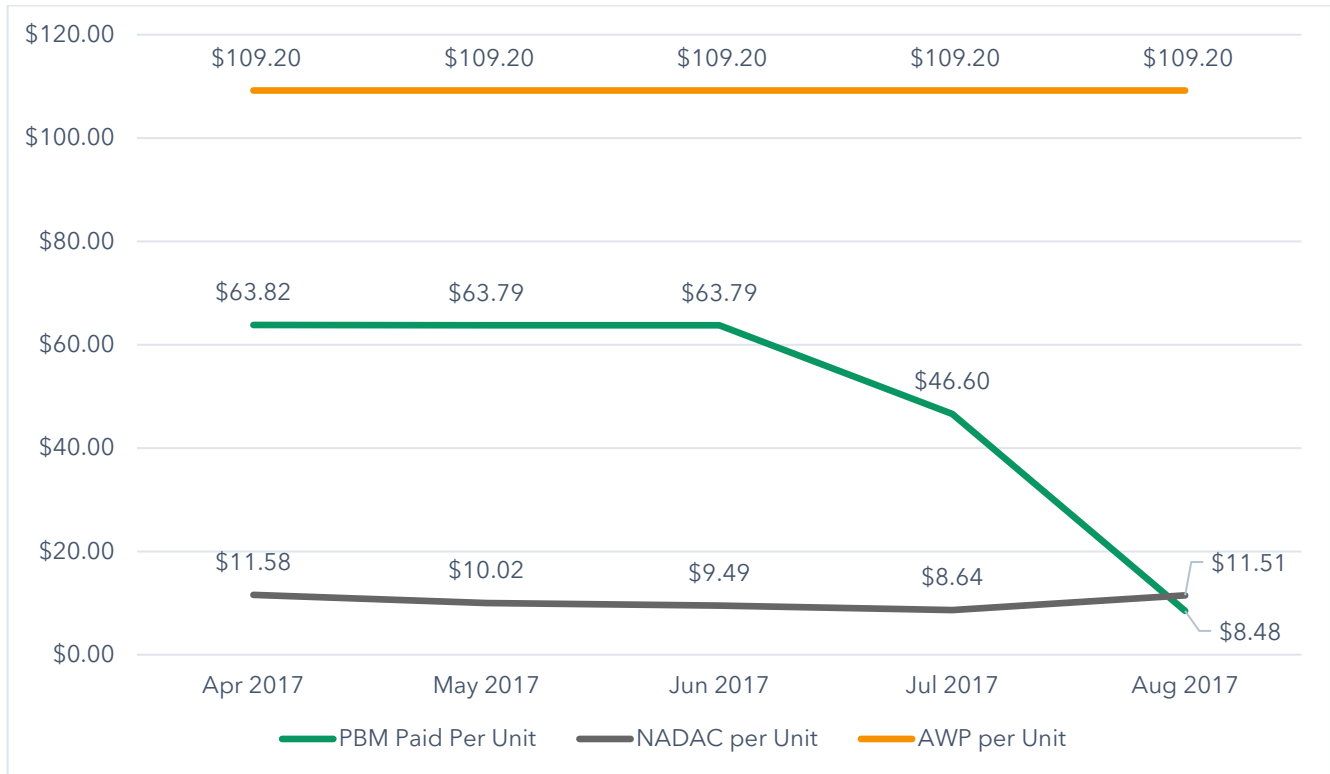


Source: CMS SDUD, Massachusetts

#### 4.5.4 High-Margin Claims Becoming Low-Margin Claims

As previously mentioned, another outcome of PBM MAC-based generic reimbursement is price volatility. Because PBM reimbursements for drugs change frequently, previously highly reimbursed drugs can become low reimbursed drugs. This can create distortions to those with variable pricing among interchangeable generic drugs (as seen with metformin 1,000mg). We already identified that the highest margin oral generic medication within our 43-pharmacy data set was a claim in 2017, which was associated with \$4,883.84 in prescription profit. This was a claim for omeprazole-sodium bicarbonate 20-1,100mg capsules paid under PBM A (the specific NDC was 69097091302). If we look at all reimbursements for this product at the NDC level under this plan and PBM processor (PBM A) in 2017, we can see how a highly reimbursed generic medication changes into a low reimbursed claim over time. In [Figure 4-24](#) on the following page, we examine the PBM-provided reimbursement per unit per month for this NDC in 2017, the underlying acquisition cost as demonstrated by the NADAC price per unit, as well as the “list price” AWP per unit. In April, the pharmacy reimbursement was \$63.82 per unit, and by August the reimbursement had dropped to \$8.48 per unit, a decline of 87%. The underlying cost for the medication was largely unchanged, and the high margin per claim which pharmacies were receiving ultimately became a low margin, “underwater” claim.

Figure 4-24: PBM A Reimbursement for Omeprazole-BiCarb 20-1,100 mg, 2017



Source: 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid

To be clear, we are not advocating for more omeprazole-sodium bicarbonate utilization. Having studied omeprazole-based products in great detail in our 2019 study of Nexium, we do not consider this product to be of high value, especially when compared to the cost of its component ingredients.<sup>45</sup> If we examine reimbursement for omeprazole 20mg and two units of sodium bicarbonate 650mg (nearly the equivalent of the 1,100mg found in this product) in July 2017, we can see that the base components cost \$0.06 per dose (\$0.04 for omeprazole 20mg + \$0.02 for two units of sodium bicarbonate 650mg), compared to the ingredient cost of the combination product of \$8.64 or purchase price of \$46.60 per dose as shown in [Table 4-7](#).

Table 4-7: PBM A Omeprazole-Based Product Reimbursement, July 2017

Product	PBM Paid Per Unit	NADAC per Unit
Omeprazole 20mg	\$0.13	\$0.04
Sodium Bicarbonate 650mg (x2 pills)	\$0.04	\$0.02
Omeprazole-Bicarbonate 20-1,110mg	\$46.60	\$8.64

Source: 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid

However, omeprazole-bicarbonate is a useful way of showing how important the current PBM price-setting and coverage functions are to payers and pharmacies. Although not included in [Figure 4-24](#), the reimbursement for the product was \$53.68 in March 2016, indicating that the PBM raised reimbursement for this product in 2017 (NADAC in March 2016 was \$14.32, so the margin was lower than these examples). We cannot investigate omeprazole-bicarbonate to the full extent we would like, but questions we would ask include:

- 1) Why was omeprazole-bicarbonate covered by the PBM instead of preferring the separate, significantly cheaper components for coverage?

- 2) What was the PBM's basis for reimbursement for omeprazole-bicarbonate?
- 3) What was the PBM's rationale for the price increase from 2016 to 2017 and the decrease in July and August 2017 compared to earlier months?

One explanation may be that guarantees played a role in the PBM selecting this drug for coverage and incentivizing its dispensation via increased reimbursement.

Within all Medicaid prescription drug programs, states are required to cover all products that participate in the Medicaid Drug Rebate Program (MDRP).<sup>46</sup> Known as an open formulary, this Medicaid requirement is different from a closed formulary, which is the near universal standard employed by other health plans (i.e., commercial, Medicare [with some exceptions], Veterans Health Administration, etc.). A closed formulary allows plans to exclude drugs from coverage, such as those with limited or inadequate evidence of clinical efficacy or those where another option may exist at a lower net cost.<sup>47</sup> Federal rules do allow Medicaid programs to manage prescription drug expenditures with tools like [Preferred Drug Lists \(PDLs\)](#) and [prior authorization \(PA\)](#) programs. As state Medicaid programs set drug coverage in a way to minimize costs through their own state created PDL, enforcement of the PDL via PA processes becomes critical to controlling prescription drug costs.

To analyze this further, we attempted to identify additional products like omeprazole-sodium bicarbonate being dispensed in Massachusetts Medicaid. We were specifically looking for products whose costs were significantly higher than their base components. While these products may not be directly substitutable by the pharmacy based upon how the prescription was written, their presence in the CMS data for Massachusetts Medicaid may signal potential weaknesses in PA administration by Massachusetts Medicaid's FFS or managed care programs, which inevitably raises costs to the state.

In [Table 4-8](#) on the following page, we have identified five generic drugs—amlodipine-atorvastatin, ezetimibe-simvastatin, olanzapine-fluoxetine, pioglitazone-metformin, and sumatriptan-naproxen—which were dispensed within Massachusetts Medicaid at significant added cost relative to less expensive alternative medications in 2018. Note that when N/A appears in the table, it signals that there was no reported utilization in that program, so cost could not be quantified for that product. Savings per unit for the alternatives to amlodipine-atorvastatin, ezetimibe-simvastatin, olanzapine-fluoxetine, pioglitazone-metformin, and sumatriptan-naproxen are all greater than 90% at the cost of two pills per dose instead of one when calculated based upon the NADAC for the alternative product.

Table 4-8: Example Products Dispensed through Massachusetts MCOs with Lower Cost Alternative Pricing, 2018

Product Name	Charge Per Unit	Alternative Product (s)	NADAC per Unit	Alternative Total Cost	% Savings
Amlodipine-Atorvastatin Tablet 10-10 MG	MCO: \$4.56	Amlodipine Tablet 10 MG	\$0.02	\$0.08	98%
	FFS: \$3.36	Atorvastatin Tablet 10 MG	\$0.06		
Ezetimibe-Simvastatin Tablet 10-40 MG	MCO: \$3.18	Ezetimibe Tablet 10 MG	\$0.25	\$0.29	91%
	FFS: N/A	Simvastatin Tablet 40 MG	\$0.04		
Olanzapine-Fluoxetine Capsule 6-25 MG	MCO: \$8.91	Olanzapine Tablet 7.5 MG	\$0.16	\$0.19	98%
	FFS: N/A	Fluoxetine Capsule 20 MG	\$0.03		
Pioglitazone-Metformin Tablet 15-500 MG	MCO: \$2.17	Pioglitazone Tablet 15 MG	\$0.09	\$0.11	95%
	FFS: \$1.16	Metformin Tablet 500 MG	\$0.02		
Sumatriptan-Naproxen Tablet 85-500 MG	MCO: \$63.00	Sumatriptan Tablet 100 MG	\$0.60	\$0.66	99%
	FFS: N/A	Naproxen Tablet 500 MG	\$0.06		

Source: CMS State Drug Utilization Data, Massachusetts, 2018

We can see a signal within [Table 4-8](#) that the FFS program may be more effectively managing combination products compared to the managed care program by directing patients who need them to use each of the individual components at lower cost, given the lack of available pricing, and therefore utilization in CMS SDUD, for three out of the five products in all of 2018. When we aggregate these differences, using separate products vs. the combination product equates to \$8.83 in savings per prescription (range: \$2.06 to \$62.34), or approximately \$100 per patient per year chronically on one of these therapies.

We recommend additional investigation into formulary and utilization management strategies employed by both FFS programs and MCOs to control these and other high-cost combination products. Specifically, formulary files and prior authorization determinations should be evaluated to determine best practices across Medicaid that can be employed by either FFS programs or MCOs.



## 4.6 LESSONS LEARNED FROM PHARMACY CLAIMS DATA

By reviewing pharmacy reimbursement trends in Massachusetts Medicaid for 43 independent and small chain pharmacies, we have observed that payments made by Massachusetts' MCOs are, in the aggregate, not sufficient to cover pharmacy operating costs. We also found that, unlike FFS, MCO payments can vary considerably from one drug to another. This volatility in generic pricing can be attributed to the preferred pricing methodology (i.e., MAC-based) employed by PBMs for generic drugs. Over time, this creates an incentive to dispense drugs that arbitrarily pay the highest margins, which can lead to pharmacies seeking out patients with certain disease states or shifting utilization of a product from one NDC to an interchangeable NDC to increase revenues (such as observed in [Section 4.5.3](#)). Pharmacies who are unsuccessful in securing fills of these more lucrative medications must instead dedicate significant resources to managing purchases and inventory, or on efforts to manage their payer networks to reduce exposure to less profitable patients and payer groups. In short, the most unsettling finding is that the incentives MCOs provide to pharmacies to improve their financial well-being reward the successful arbitrage of PBM-created drug pricing distortions, rather than improvement of patient outcomes and health. We urge Massachusetts to further investigate the incentives born out of a reimbursement system born of PBM MAC rates to ensure that it aligns with its goal to improve healthcare outcomes for its Medicaid beneficiaries.

We have also observed that MCOs and their PBM partners can restrict access to the most profitable generic drugs by restricting their dispensation to pharmacies outside the 43 pharmacies in our study. While these pharmacies represent a fraction of the overall Massachusetts pharmacy market, based on our prior research in other states and programs, it is likely that, upon further examination of the entire Massachusetts community pharmacy marketplace, these trends would extrapolate to an overwhelming majority of the state's community pharmacies. This observation is most readily explained by the industry practice of specialty pharmacy steering. Because pharmacy business operations are unpredictable due to nontransparent MAC pricing, rapid changes in pricing month-over-month, and restricted access, pharmacies often cannot risk setting low, market-based cash prices, as it would hurt their principle source of revenue: the lucrative and erratic high-margin generic claim. Because people with insurance overwhelmingly outnumber those without insurance in Massachusetts, if pharmacies miss the opportunity to dispense the small volume of highly profitable generic drugs available to them, their current business model would be unsustainable. This complex yet addressable dynamic is one of the key drivers of high drug prices in this country.

The Massachusetts Medicaid FFS program provides an alternative incentive to pharmacy business operations in the state. By setting fixed dispensing fees on top of a known, transparent benchmark that more appropriately reflects drug acquisition costs, the FFS program helps address the concern that pharmacies could seek out patients with the highest profit margin medications over others. At a philosophical level, by fixing the dispensing fee at the cost of dispensing (as is done in the Medicaid FFS program), the state can better sterilize the seemingly arbitrary distribution of over-incentives and disincentives across the state's drug utilization portfolio. This would also ensure that pharmacies can dedicate adequate time to perform their routine job functions (e.g., reviewing and interpreting physician orders, completing drug utilization review [DUR] activities, preventing medication errors, and counseling patients).

## 5 ASSESSING SPREAD PRICING IN MASSACHUSETTS MEDICAID MANAGED CARE

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This section reviews charges made to Medicaid for claims dispensed at pharmacies to analyze whether the supply chain is taking a “spread” via MCOs or PBMs. Without a prevailing and transparent market price governing any claim (such as exists within state-run Medicaid programs), two prices are created during pharmacy claims transactions. Price 1 is the price charged to the payer (or MCO). This is a price that, when lumped together with all other prices, will deliver on the PBM’s committed discount to some overall generic AWP. Price 2 is the price paid out to the pharmacy provider, which the PBMs have proven can be pushed down to acquisition cost or even below (as is the case with Massachusetts Medicaid managed care, seen in the growth of “[underwater](#)” claims). Add up the difference between all payments made at Price 1 and Price 2 across all drugs purchased by a payer/MCO, and that is spread—most of which typically occurs with generic drugs.

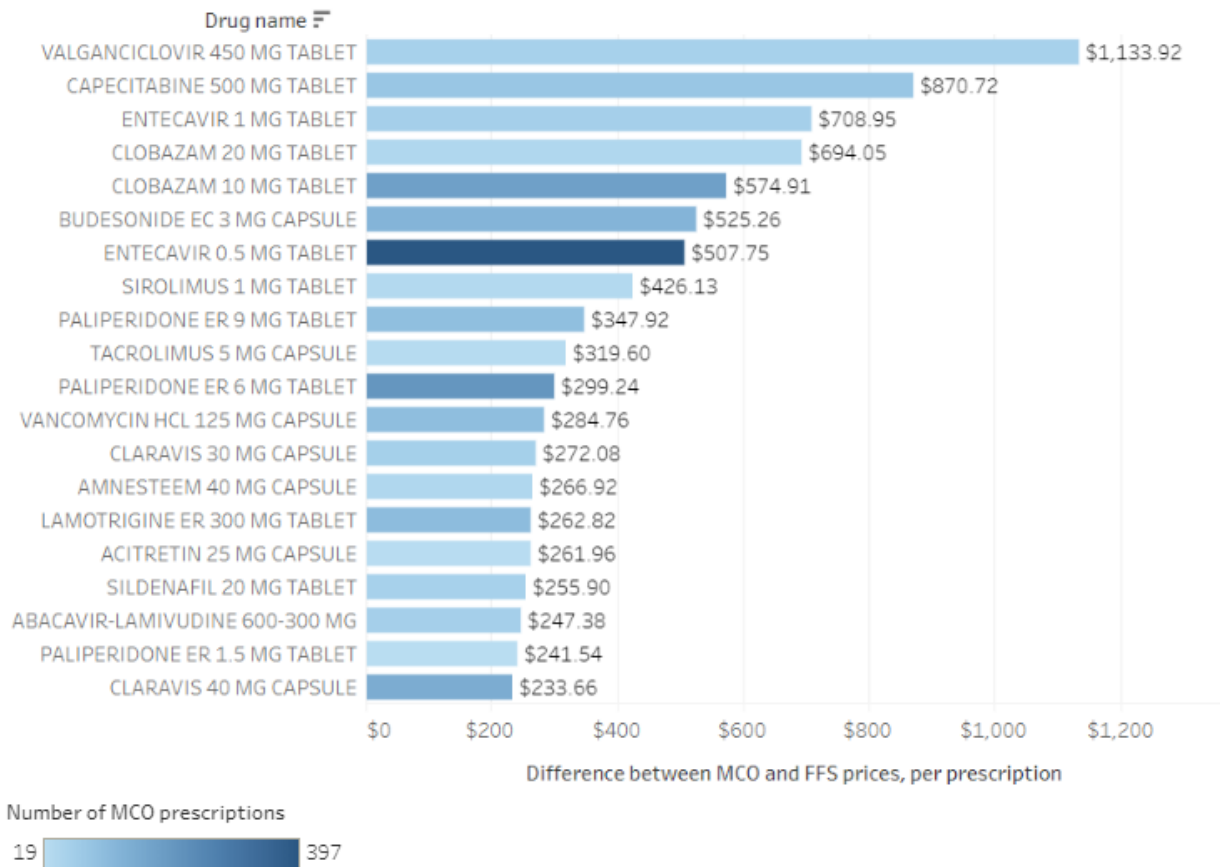
The practice of spread pricing has received increased scrutiny in recent years, with several states launching their own probes into the typically hidden PBM revenue stream.<sup>48</sup> In 2018, Ohio reported finding \$225 million in PBM spread in one year, \$208 million of which came from generic drugs (31.4% of gross generic cost).<sup>49</sup> Ohio also uncovered an additional \$20 million in MCO spread.<sup>50</sup> Kentucky reported similar findings in their PBM audit, with an overall spread of \$124 million (13% gross drug cost) in one year despite only 57.6% of all claims being transacted in a spread model.<sup>51</sup> An audit conducted in Maryland found \$72 million in spread, amounting to a sizable \$6.96 per prescription.<sup>52</sup> These findings have resulted in a pending federal push to prohibit the practice in all state Medicaid programs.<sup>53</sup>

In February 2019, the Massachusetts Health Policy Commission (HPC) released its *2018 Annual Health Care Cost Trends Report*, which highlighted some of the above state findings and recommended that “The Commonwealth should increase state oversight of PBM pricing and take steps to limit the practice of ‘spread pricing.’”<sup>54</sup>

Later, in June 2019, the Massachusetts HPC released a *DataPoints* issue titled, “Cracking Open the Black Box of Pharmacy Benefit Managers.”<sup>55</sup> That report further highlighted spread pricing’s inflationary impact on generic drug costs within both the state’s Medicaid managed care program and commercial sector. A selection of those findings is shown in [Figure 5-1](#) on the following page. As can be seen in the HPC findings, the difference in payment for the same drug can be significant given that the MCO payment rates to pharmacies are not predicated on a fixed cost (i.e., \$10.02 dispensing fee) above the acquisition cost of the drug (i.e., NADAC).

Figure 5-1: *Cracking Open the Black Box of Pharmacy Benefit Managers, Top 20 Generic Drugs*

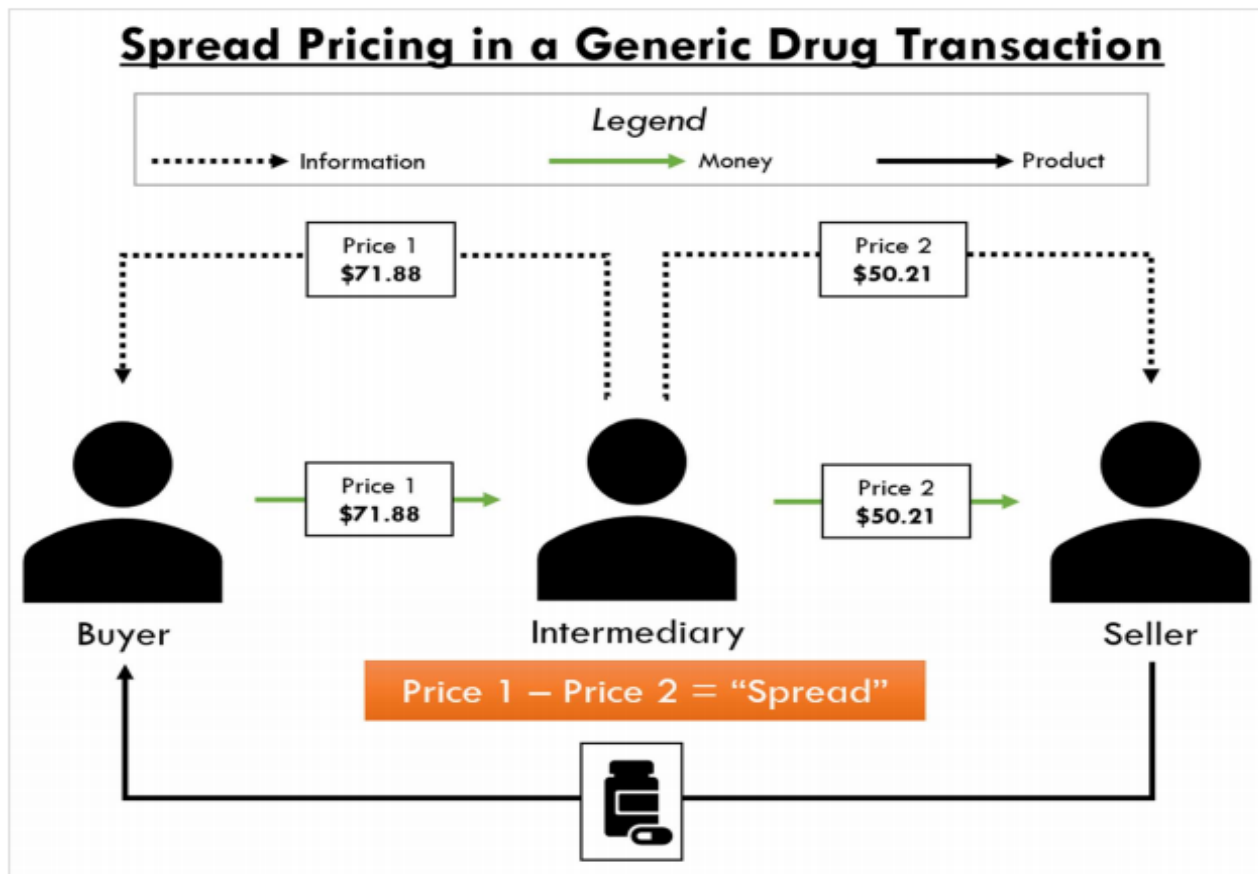
## Top 20 generic drugs in the MassHealth MCO program by average difference between MCO and FFS prices per prescription, 2018 Q4



Source: Massachusetts HPC June 2019 DataPoints, Issue 12

The operational flow of the spread pricing process is best summarized in [Figure 5-2](#) on the following page.

Figure 5-2: Spread Pricing in a Generic Drug Transaction



Source: 3 Axis Advisors illustration

We do not have claim-level detail from Massachusetts Medicaid (i.e., the payer) specific to the 43 pharmacies we have relied upon in this study to enable a detailed, claim-by-claim analysis. Such data would allow us to compare the per-claim reimbursement to the pharmacy to the per-claim charge to Medicaid or the MCO, as we were able to do earlier this year in the state of Florida.<sup>56</sup> Rather, we will rely upon Massachusetts Medicaid data from CMS' SDUD in a manner similar to our April 2019 Michigan Medicaid analysis.<sup>57</sup> To conduct the analysis, we used the CMS SDUD to effectively generate a new pricing benchmark for our Massachusetts Medicaid claims—that of the "[charge per unit](#)" for each NDC. We define charge per unit as the CMS-derived payment amount per unit of each NDC. We generated the charge per unit price by taking all NDCs dispensed within Massachusetts Medicaid according to CMS SDUD and dividing the Medicaid amount paid identified for the NDC and delivery system (i.e., FFS and managed care analyzed separately). This amount is further divided by the units dispensed for each quarter and year to arrive at a charge per unit. This represents the average charge to the state in each Medicaid program type for the NDC in a year and quarter. We then joined the charge per unit for each NDC to the claims data for our 43 pharmacies. We matched the payer on the claim (i.e., FFS claims matched to FFS charge per unit, and managed care claims to managed care charge per unit) by matching NDCs and the date of service of each claim to the corresponding NDCs in the year and quarter associated with the average charge price.

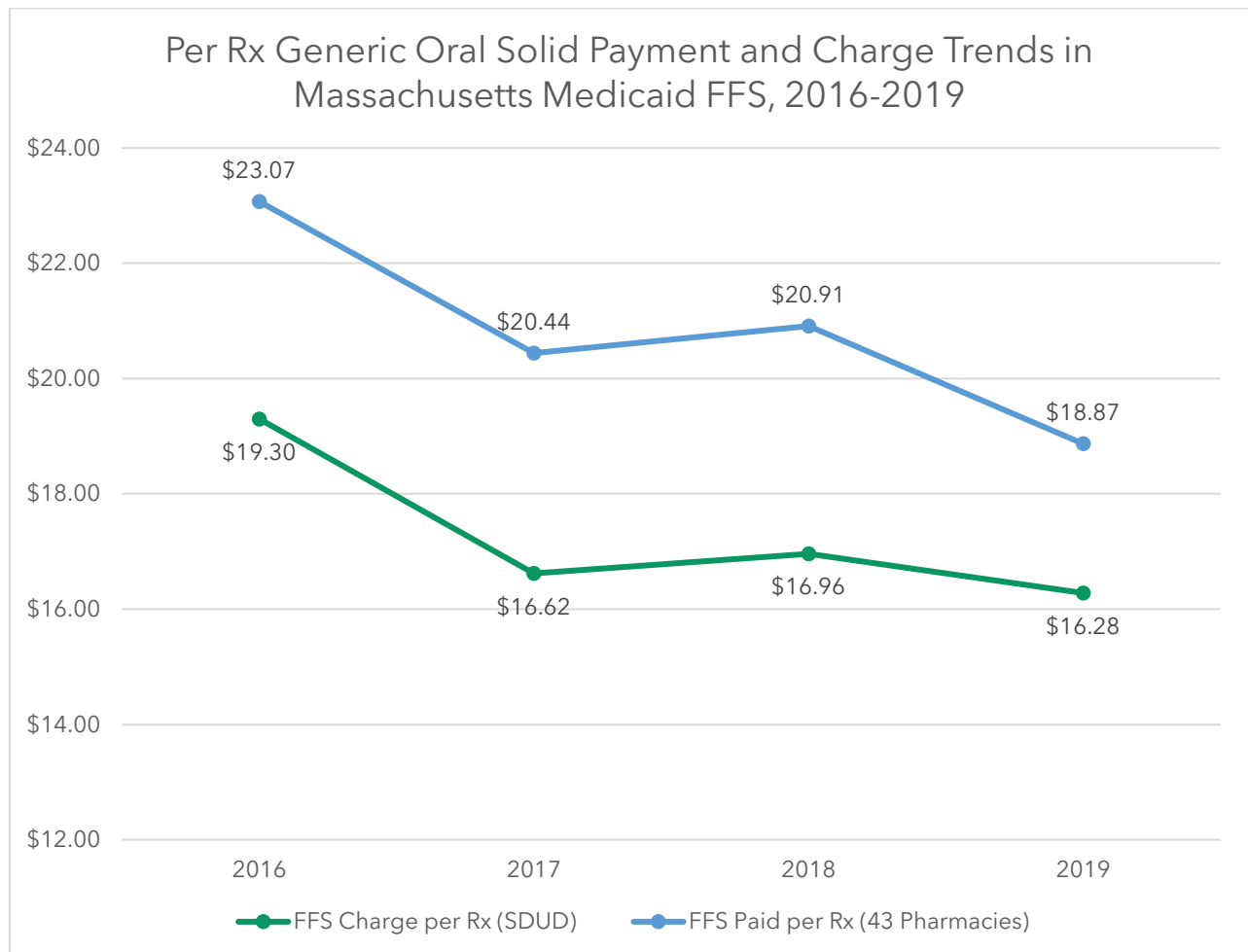
Keep in mind that this comparison takes the data from our 43 sampled community pharmacies and compares it to aggregated CMS data from all of Massachusetts' approximately 1,100 retail pharmacies. This enables us to "ballpark" possible distortions in the program and assess how the experience of these small community pharmacies compares to that of the overall Massachusetts

pharmacy marketplace. For more details about this database, please refer to the appropriate [methodology](#) section toward the end of this report.

## 5.1 GENERIC ORAL SOLIDS

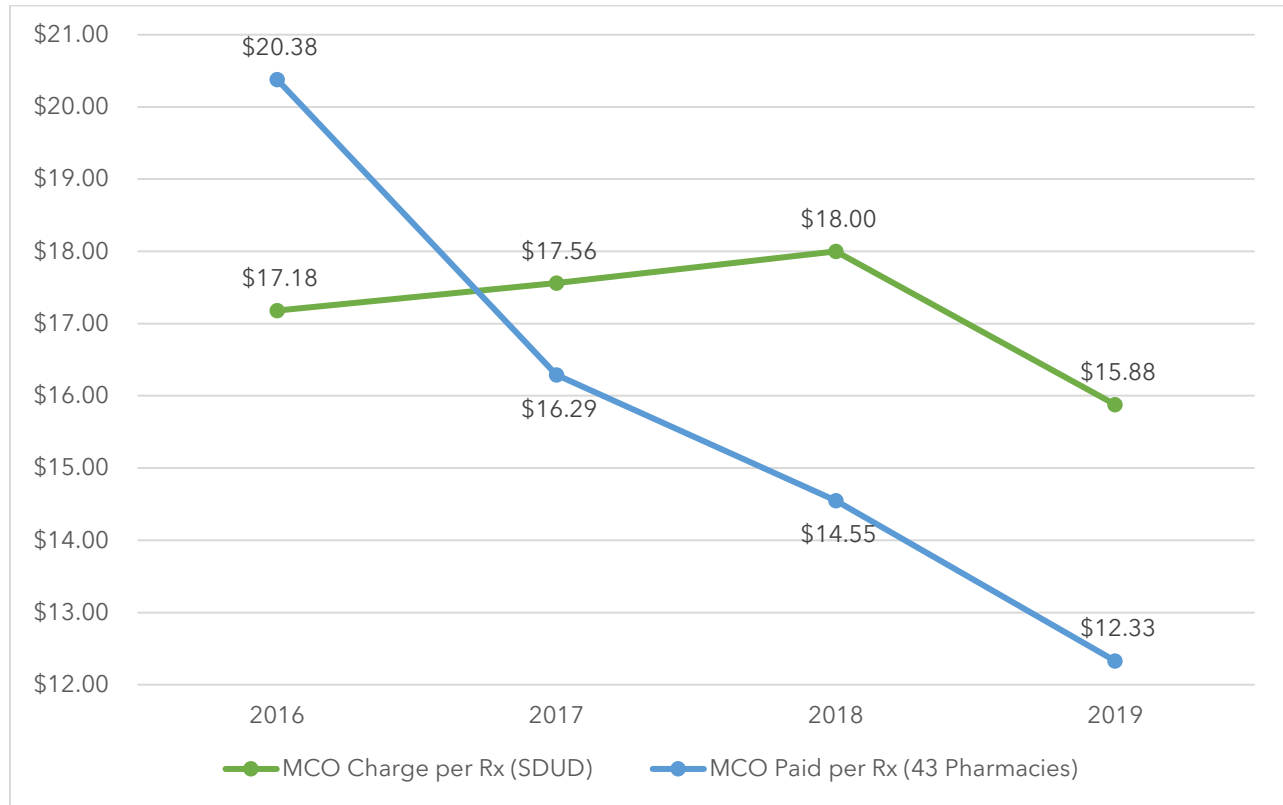
We first wanted to assess the differences between the CMS SDUD charge price to the state of Massachusetts and the actual payments to pharmacies for the 43 pharmacies in our study. We focused our analysis on all generic oral solid medications dispensed. Generic oral solid medications were selected for the same reasons [previously described in this report](#). We observe in [Figure 5-3](#) that the 43 pharmacies from our sample are generally receiving more revenue per claim when dispensing under the FFS program compared to the aggregate Massachusetts pharmacy experience in Medicaid. This is because the FFS [payment line](#) is higher than the [charge line](#) in [Figure 5-3](#). Conversely, we observe the opposite effect in [Figure 5-4](#) on the following page: when claims are dispensed under the managed care program, the [charge line](#) is generally higher than the [payment line](#) for our 43 sample pharmacies.

Figure 5-3: Per Rx Generic Oral Solids Payment and Charge Trends in Massachusetts Medicaid FFS, 2016-2019



Source: CMS SDUD, Massachusetts; and 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid

Figure 5-4: Per Rx Generic Oral Solids Payment and Charge Trends in Massachusetts Medicaid MCOs, 2016-2019

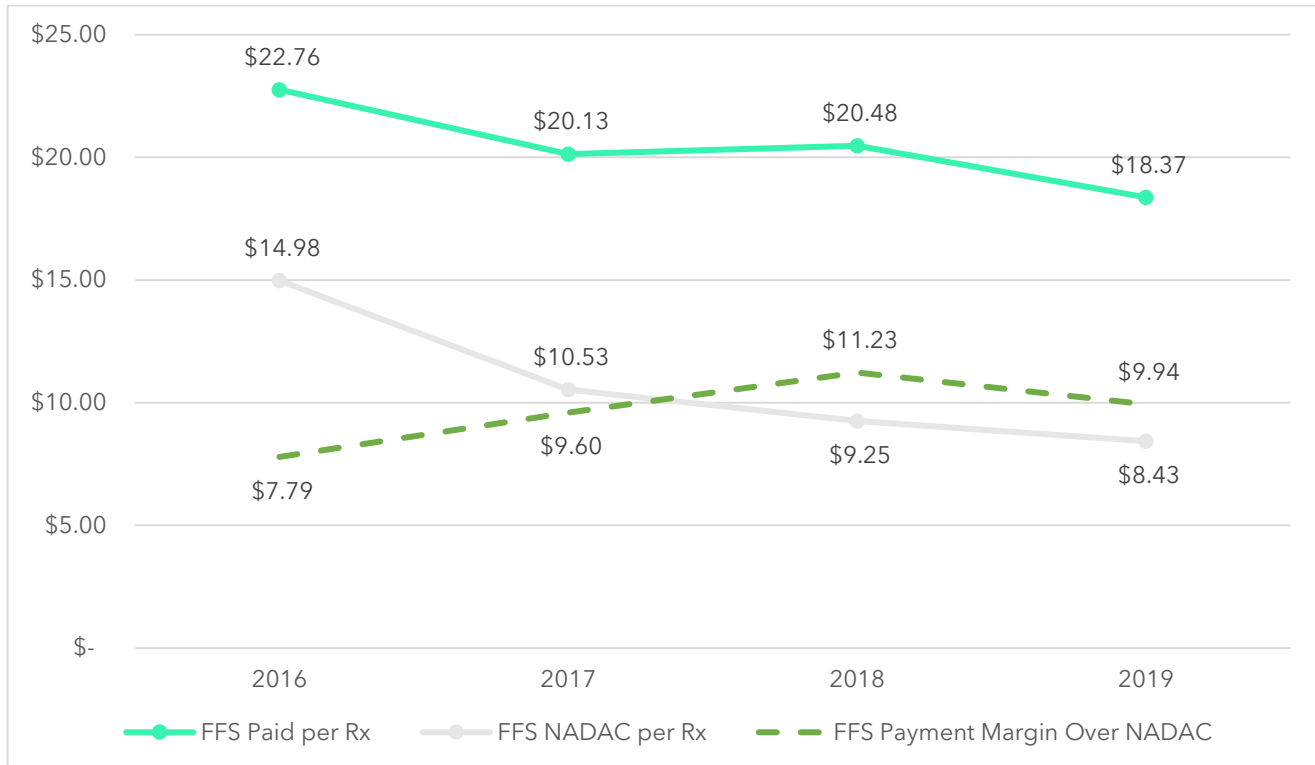


Source: CMS SDUD, Massachusetts; and 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid

It is noteworthy that the experience for our 43 sample pharmacies depends upon whether the claim was dispensed in the FFS or the managed care program. When we consider the FFS experience, Figure 5-3 suggests that other pharmacies are being reimbursed less (or submitting lower costs via their U&C) for the same products dispensed at the same quantity during the same quarter and year. When we consider that those 43 pharmacies are independent and small chain, we may be able to explain this observation by highlighting that some large chain pharmacies offer medications at \$4 and \$10 cash prices, which would lower the aggregate charge to Medicaid under "lower of reimbursement." Additionally, long-term care or mail order pharmacies generally have lower cost to dispense per prescription and receive lower reimbursement per prescription of generic drugs than other types of pharmacies, which would also lower the average aggregate amounts charged to the Medicaid FFS program.

Focusing on the FFS program experience, we added in the average NADAC cost for generic oral solids to confirm FFS payments to the 43 pharmacies remained in line with the Massachusetts FFS payment methodology. As can be seen in Figure 5-5 on the following page, aggregate FFS payments after 2016 are approximately \$10.02 above the NADAC for the generic product (Payment Margin over NADAC line). The principal explanation for why the payments are not precisely \$10.02 above NADAC is attributable to the fact that we lag generic NADAC costs as per our methodology section and cannot account for provider-submitted U&C charges, which may result in lower of reimbursement being applied to the claim. In terms of Payment Margin over NADAC, there is a noticeable increase from 2016 to 2017 following the state's movement to a NADAC plus \$10.02 payment structure. As these observations match those made earlier in this report, we can reasonably explain the experience of payment and charge trends within Massachusetts' FFS Medicaid program.

Figure 5-5: FFS Per Rx Generic Oral Solid Payment and Acquisition Cost Trends, 2016–2019



Source: CMS SDUD, Massachusetts; and 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid

As previously noted, the opposite observation for our 43 sample pharmacies is occurring in the Massachusetts managed care program. Over time, payments to these pharmacies have been considerably less than the payments recognized in the aggregate Medicaid program for all of Massachusetts pharmacies. Because utilization is being fixed to that of the 43 pharmacies by comparing only NDCs dispensed at them to the SDUD data (and not all available NDCs within SDUD), one possible explanation for this observation may be associated with MCO- or PBM-affiliated pharmacies receiving higher reimbursements to dispense the same drug in the same quantity at the same time. We observed this practice previously in our 2020 Florida Medicaid analysis, and we would urge Massachusetts to investigate such practices.<sup>58</sup> However, it seems unlikely that this would entirely account for the aggregate differences we observe in Massachusetts, as affiliated pharmacies are generally limited to specialty pharmacies, which do not dispense high claim volumes. Rather, they dispense high-margin claims more often (see Section 5-4 on [Specialty Pharmacy Steering](#)).

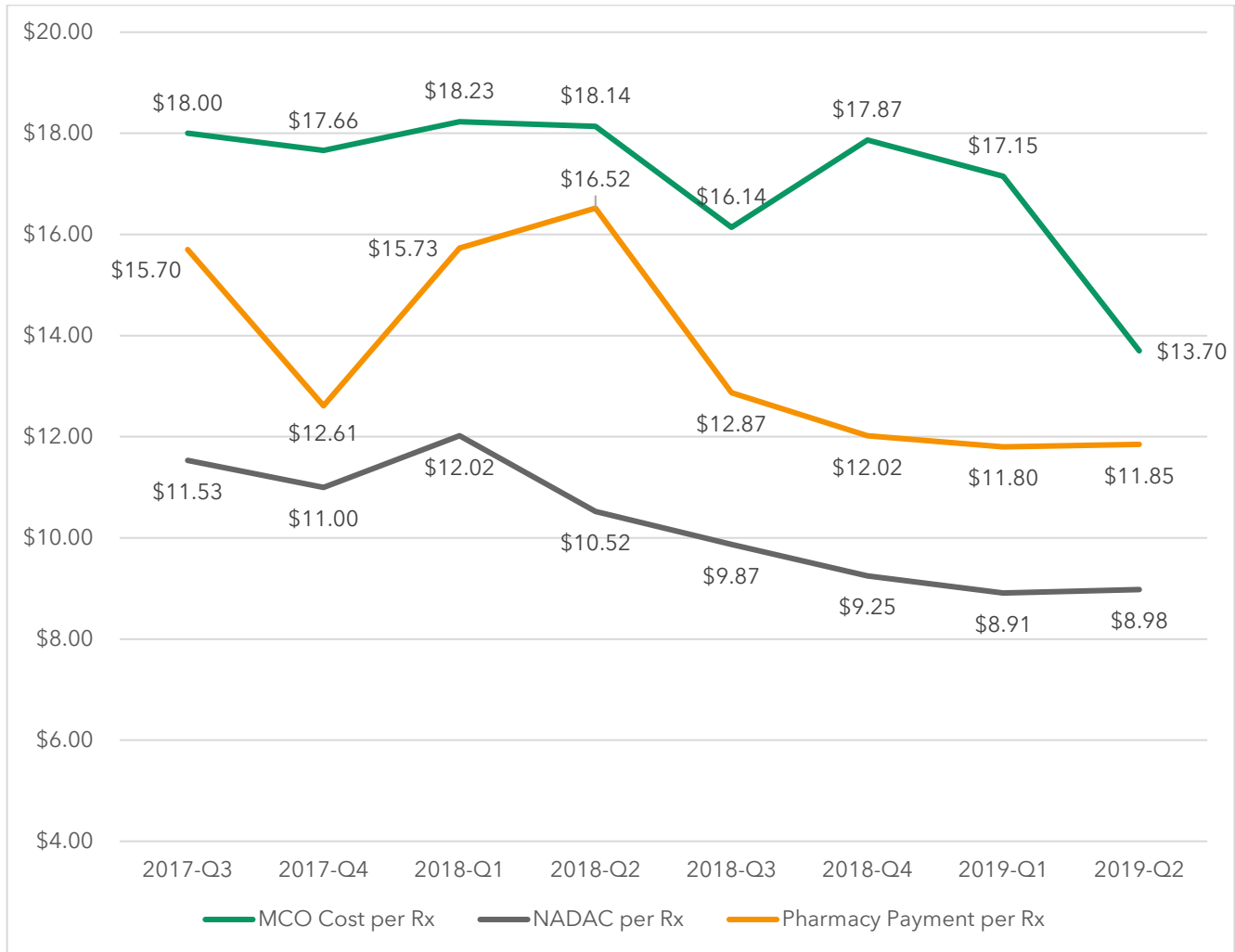
To further scrutinize these findings, we graphed the last two and a half years of MCO claims data by quarter for our 43 sample pharmacies based upon the average charge per prescription within the Medicaid managed care program, the average NADAC per prescription, and the average pharmacy payment per prescription. This allowed us to compare and assess the average rates charged by MCOs/PBMs to the Massachusetts Medicaid program for all claims dispensed at all retail pharmacies, the average invoice costs paid by all retail pharmacies to acquire the drugs dispensed within those claims, and what our sample 43 pharmacies were actually paid by MCOs/PBMs for the claims they dispensed to Medicaid beneficiaries.

As can be seen in [Figure 5-6](#) on the following page, although charges to the state are falling (approximately 21% in the two-year period), the rate of decline is not keeping pace with the declining pharmacy revenues (approximately 32% decline in the two-year period), creating a pricing spread



between the charges to Medicaid and the reimbursement to pharmacies. Since Q3 2017, the gap has grown and contracted but never vanished. At its low (Q2 2018) it was \$1.62, or 10% over the weighted average pharmacy reimbursement. At its peak (Q4 2018) it was \$5.85, or 49% over the weighted average pharmacy reimbursement.

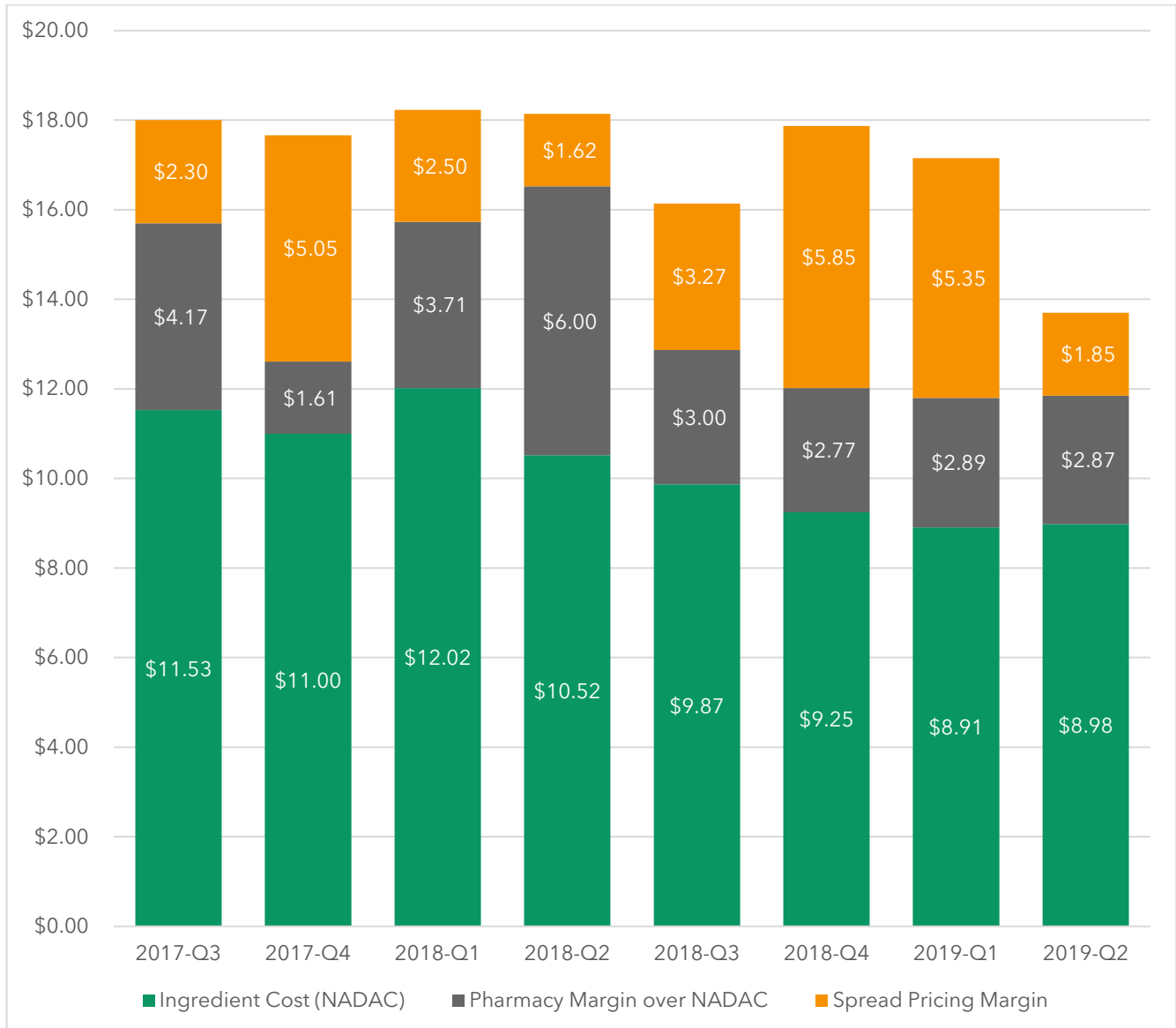
**Figure 5-6: Comparison of Massachusetts MCO Charges vs. Pharmacy Payments vs. NADAC (per Rx) for Generic Oral Solids**



*Source: CMS SDUD, Massachusetts; and 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid*

We find it helpful to also view this data using a stacked bar chart to better visualize the total dollars per prescription that are flowing to the components of the supply chain. **Figure 5-7** on the following page presents the same data in **Figure 5-6** but in a different view. For each quarter and year we graph the aggregate acquisition cost of medications dispensed by pharmacies (i.e. NADAC), the amount pharmacies received in payment above the acquisition cost per prescription in the aggregate (i.e. Margin above NADAC), and the difference between the aggregate pharmacy payment per prescription to the aggregate MCO charge per prescription (i.e. spread). For example, we can see in Q3 2017 that the average NADAC cost per prescription was \$11.53, the average pharmacy margin above NADAC was \$4.17 (i.e. \$15.70 minus \$11.53) and the average spread was \$2.30 (i.e. \$18 minus \$15.70).

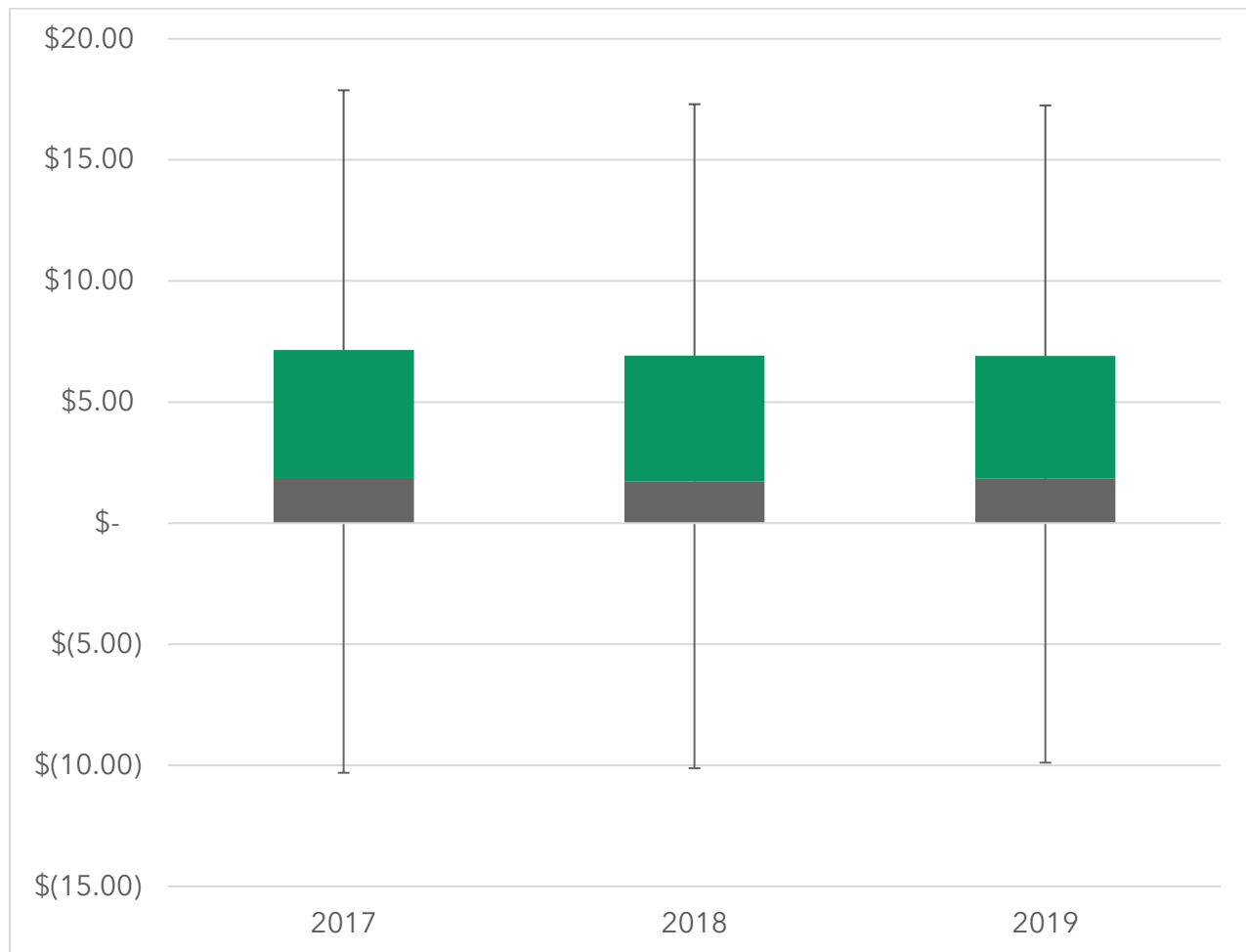
Figure 5-7: Massachusetts Medicaid Managed Care Cost per Rx Breakdown—Generic Oral Solids



Source: CMS SDUD, Massachusetts; and 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid

To make this comparison as accurate as possible, we took every generic oral solid drug summarized in Figure 5-7 with a NADAC at the NDC level and graphed the difference in charge per prescription to the corresponding payment the pharmacy received on the prescription. We put the difference for each NDC into a box plot in Figure 5-8 on the following page. (For a refresher on how to read a box blot, return to Figure 4-14.) This view again demonstrates a wide range in reimbursements for products at any given point in time, with some being overcharged and some being undercharged by PBMs to Massachusetts Medicaid MCOs.

Figure 5-8: Difference between SDUD Payment per Rx and PBM Payment per Rx by NDC, Generic Oral Solid Drugs with a NADAC, Q3 2017-Q2 2019



Source: CMS SDUD, Massachusetts; and 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid

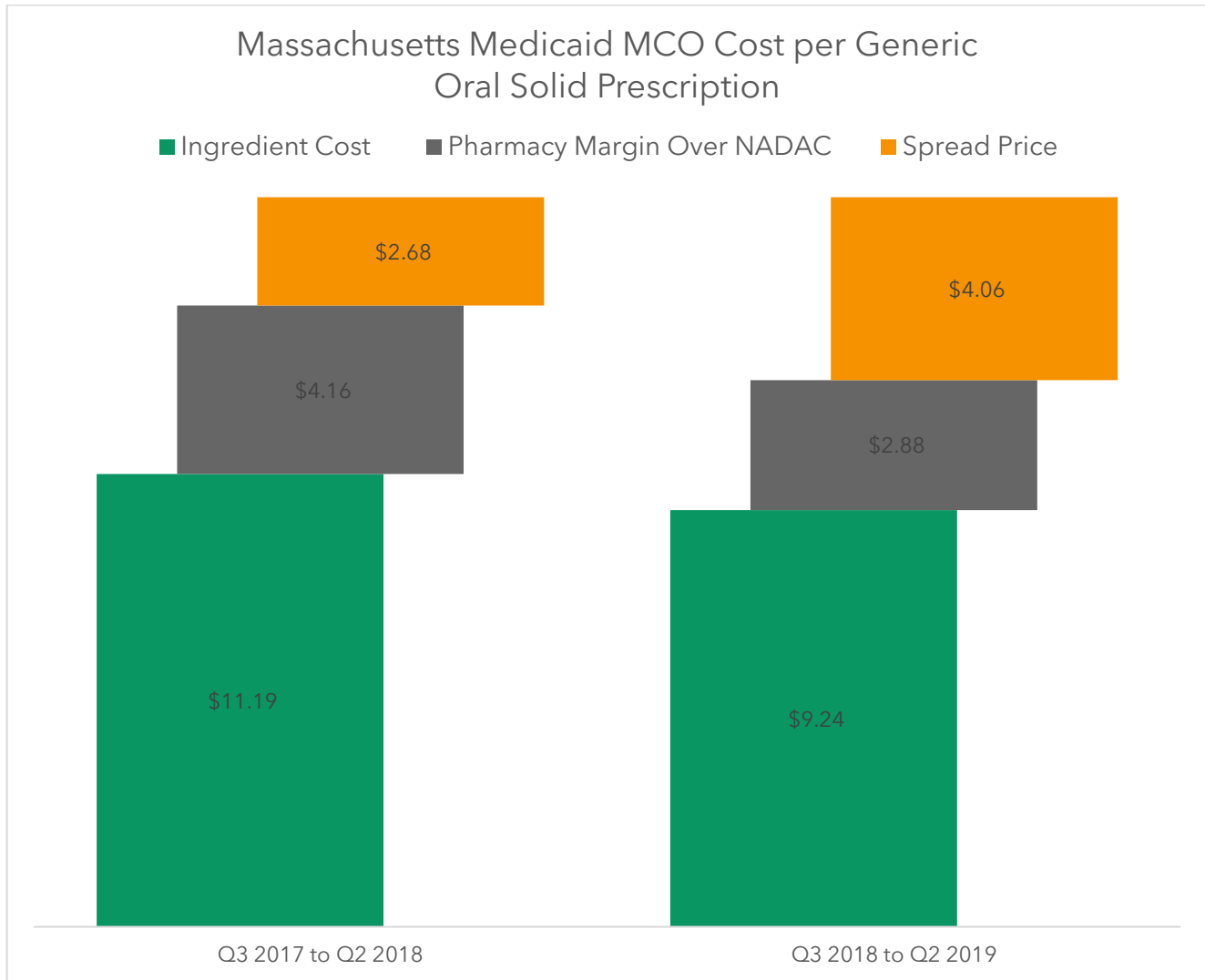
We can explain some of the arbitrary nature of reimbursement and charge differences in [Figure 5-8](#) by reviewing the typical contract language that exists between a health plan (like an MCO) and its PBM. While contract language between a PBM and its client (the payer) can vary considerably, based on our channel checks, it typically includes some sort of a contractual guarantee called a Generic Effective Rate (GER).

## 5.2 ANNUAL SPREAD PRICING ANALYSIS—GENERIC ORAL SOLID DRUGS

We calculate that, for the year represented from Q3 2017 to Q2 2018, the Massachusetts Medicaid managed care program paid a weighted average of \$18.03 per oral solid generic prescription (see [Figure 5-9](#) on the following page). The weighted average NADAC ingredient cost for those claims was \$11.19. During this same time frame, \$4.16 per prescription went to the pharmacy, while \$2.68 per prescription (a 17% markup to pharmacy payment) was retained by the payer segment of the drug supply chain (either the PBM and/or MCO). This “spread” is arrived at by considering only the NDCs for this analysis that have a NADAC and were dispensed at the 43 independent pharmacies (and therefore have a corresponding pharmacy payment value to compare the SDUD payment to the pharmacy reimbursement).

In comparison, in the subsequent year, that is from Q3 2018 to Q2 2019, the Massachusetts Medicaid managed care program paid a weighted average of \$16.18 per oral solid generic prescription. The weighted average NADAC ingredient cost for those claims was \$9.24. During this time, \$2.88 per prescription went to the pharmacy, while \$4.06 per prescription (a 33% markup to pharmacy payment) was retained by the payer segment of the drug supply chain (either the PBM and/or MCO).

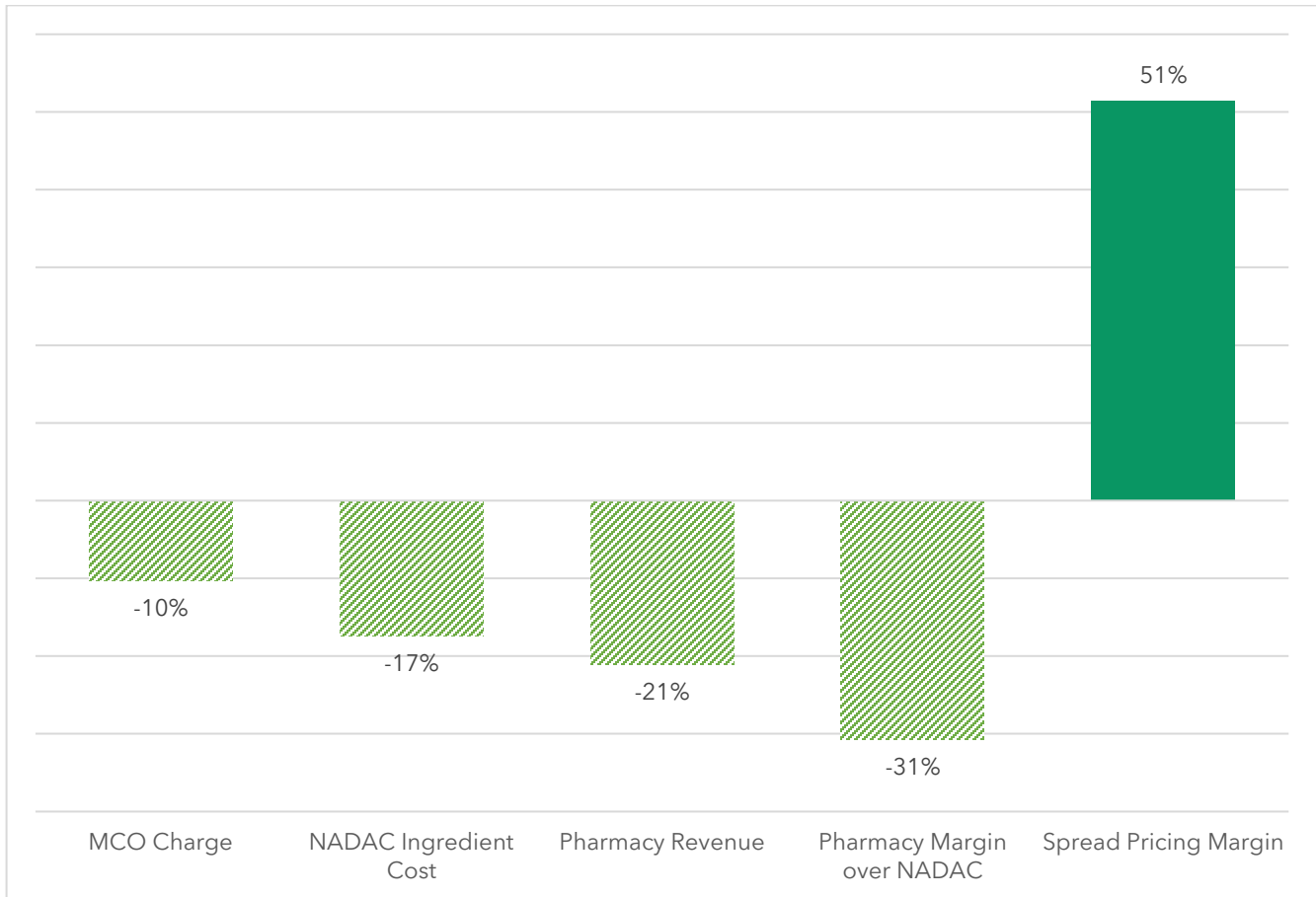
**Figure 5-9: Massachusetts Medicaid MCO Cost per Prescription Breakdown**



*Source: CMS SDUD., Massachusetts; and 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid*

**Figure 5-10** on the following page shows the year-over-year percentage changes in Massachusetts MCO costs, NADAC ingredient costs, pharmacy margin, and estimated spread pricing margin. Of note is the contraction pharmacies are experiencing via two primary mechanisms: lower ingredient costs ([previously explored in this report](#)) and a growth in spread pricing. As you can see, at the same time pharmacy margins fell by 31%, PBM/MCO spread increased by 51%.

Figure 5-10: Year-over-Year Percent Change in Cost and Revenue for Oral Solid Generics in Massachusetts MCOs



Source: CMS SDUD, Massachusetts; and 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid

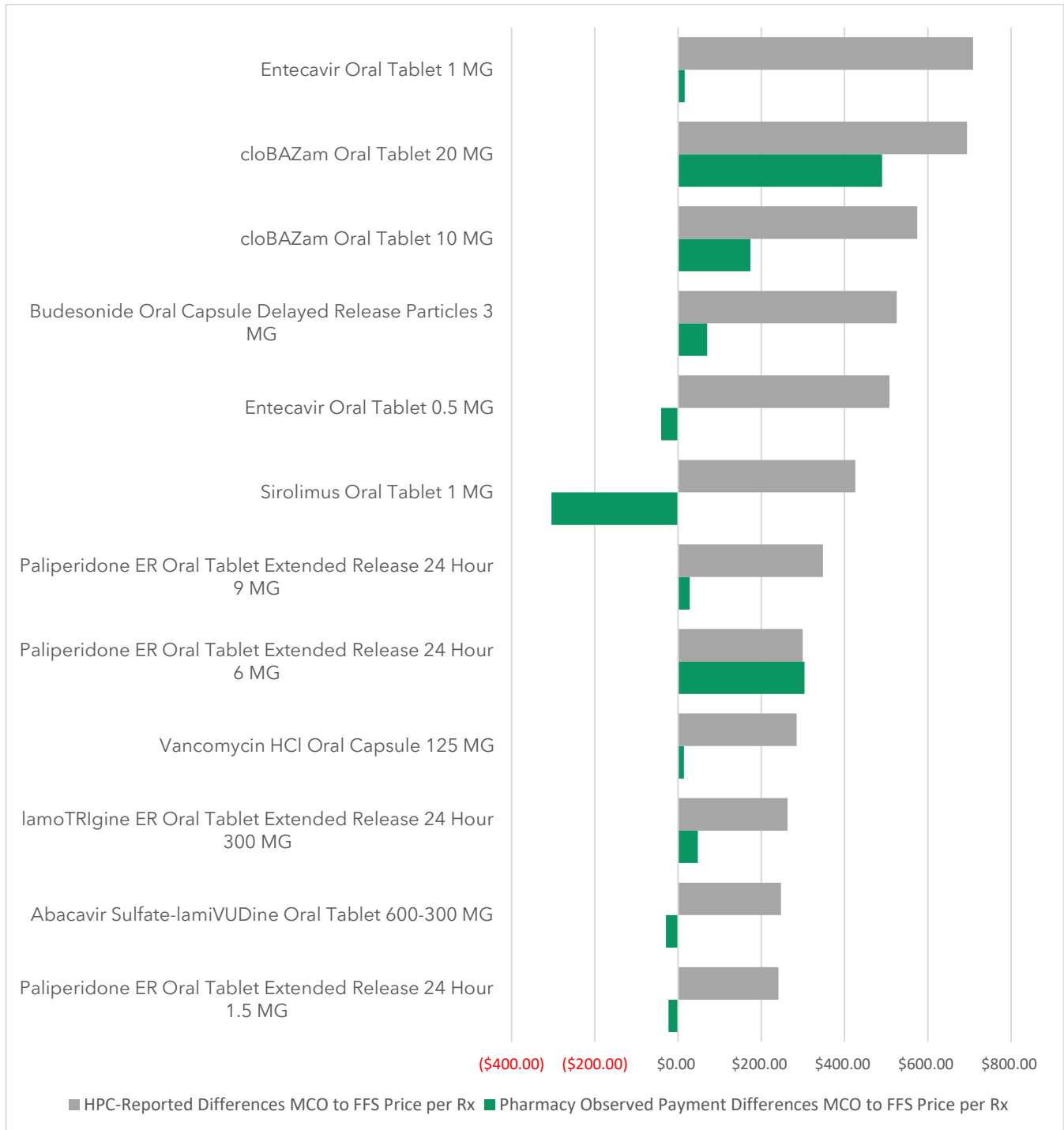
### 5.3 HIGH-SPREAD DRUGS

To help visualize spread on a more granular level, we want to first return to the drugs Massachusetts HPC previously identified of concern in its June 2019 *DataPoints* issue, which we previously presented in [Figure 5-1](#) (on page 48). Recall, that HPC presented the idea of spread pricing via a comparison of the average difference between an MCO cost for a drug and the FFS cost for the identical drug. Because the FFS program is predicated on payments at AAC and dispensing fees equal to pharmacy operational costs, when MCO costs are above FFS costs, this suggests an overpayment for the drug and an opportunity for the MCO and/or PBM to engage in spread pricing. If the cost for the drug reported by the MCO and PBM to Medicaid is not being paid to the pharmacy, but the MCO and/or PBM are retaining some of the cost, that is in essence spread pricing.

To further explore the HPC findings, we examined the 43 pharmacies' experience for the 20 *DataPoints* drugs (as seen in [Figure 5-1](#)). To do this, we found the average difference in payment to our study pharmacies for these drugs between the MCO and FFS programs in 2018. We then compared the differences in actual payment amounts to the 43 pharmacies in our study to the previously reported differences by HPC between MCO and FFS costs. (Note that we are only able to make comparisons on 12 of the 20 drugs, as several drugs were not dispensed within the study's pharmacies under an MCO.) [Figure 5-11](#) on the following page shows that 11 of the 12 drugs exhibited smaller gaps between MCO and FFS from the pharmacy's experience (the green series)

than from the state's experience (the gray series). Furthermore, in 4 of the 12 instances we see that pharmacies are being paid less in MCO than they are in FFS. Recall, Massachusetts HPC flagged these as the generic drugs with the highest relative MCO payments. However, the pharmacy's perspective paints a very different picture. The difference between these two studies is the spread pricing that is being retained by PBMs and/or MCOs in the Massachusetts Medicaid managed care program.

**Figure 5-11: Comparison of HPC-Identified MCO and FFS Price Differences to Pharmacy Experience, 2018**



In **Table 5-1**, 3 Axis Advisors presents the top 10 “spread pricing” oral solid generic drugs in 2019 for Massachusetts Medicaid. These medications were identified based upon comparing SDUD-reported charges per prescription to the pharmacy payments at our 43 pharmacies. The table shows the charge per prescription reported by the state in comparison to the payment per prescription reported by the pharmacy, as well as the NADAC ingredient cost. The list includes only those oral solid generic drugs for which we had 25 or more Massachusetts Medicaid MCO pharmacy claims.

**Table 5-1: Top 10 Spread Pricing Oral Solid Generic Drugs in 2019 (per Prescription)**

NDC Description	MCO Charge	Pharmacy Revenue	NADAC	Spread
Entecavir Tablet 1 MG	\$592.71	\$47.18	\$53.46	\$545.52
Pyridostigmine Bromide ER Tablet 180 MG	\$1,064.53	\$567.77	\$591.96	\$496.76
Entecavir Tablet 0.5 MG	\$478.77	\$39.36	\$52.14	\$439.41
Itraconazole Capsule 100 MG	\$454.93	\$53.25	\$196.02	\$401.68
Entacapone Tablet 200 MG	\$515.90	\$141.09	\$158.91	\$374.81
Budesonide Capsule Delayed Release 3 MG	\$670.51	\$347.49	\$156.17	\$323.02
Paliperidone ER Tablet 24 Hour 9 MG	\$600.53	\$307.61	\$399.42	\$292.92
Paliperidone ER Tablet 24 Hour 1.5 MG	\$406.43	\$167.08	\$271.61	\$239.35
clomiPRAMINE HCl Capsule 75 MG	\$335.96	\$96.82	\$179.07	\$239.14
Pregabalin Capsule 50 MG	\$258.73	\$24.61	\$10.94	\$234.12

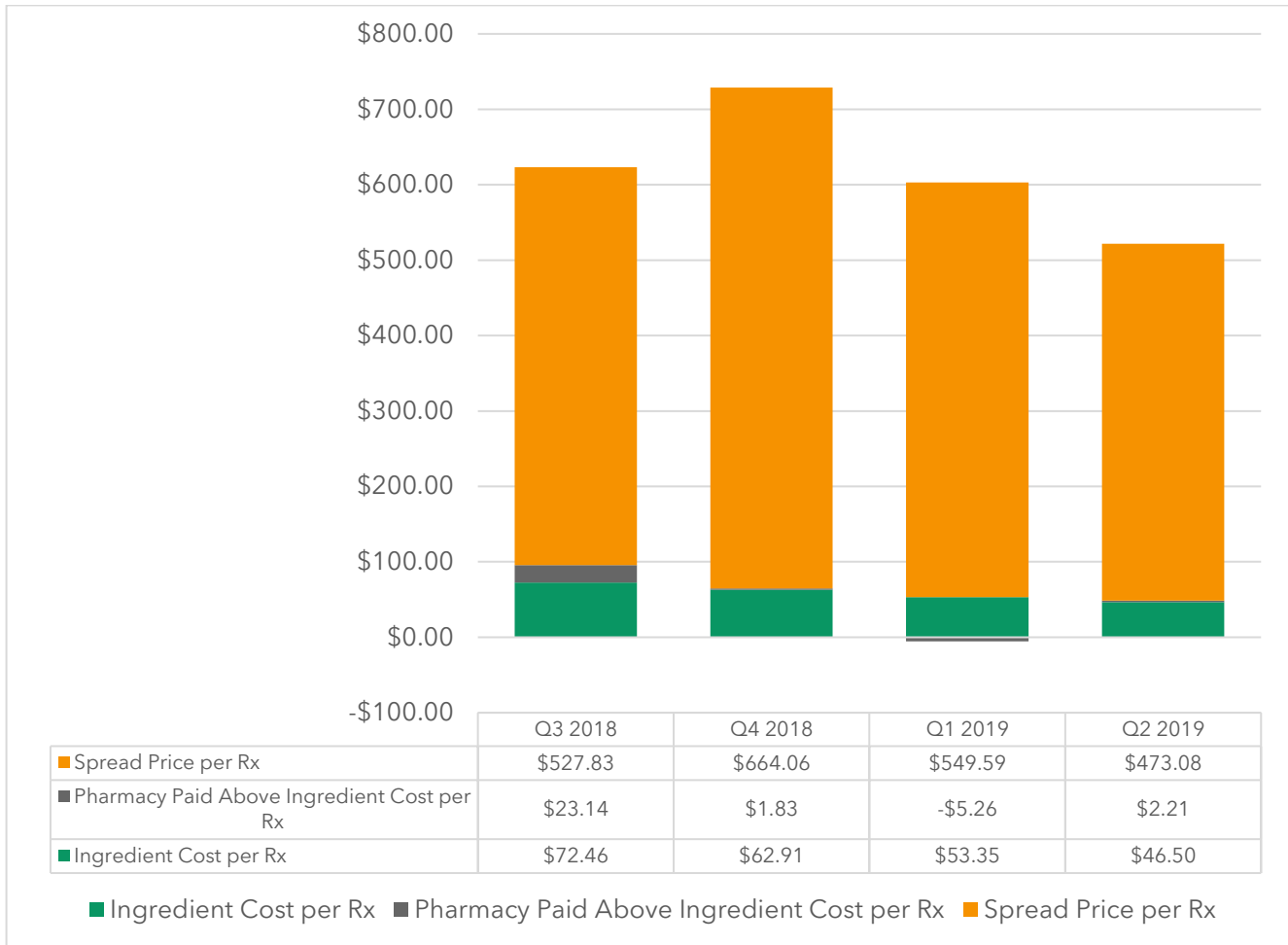
*Source: CMS SDUD, Massachusetts; and 43 Massachusetts Independent and Small Chain Pharmacies’ Claim Histories for Massachusetts Medicaid*

Note that for all but two of these medications (Budesonide Capsule Delayed Release 3 MG and Pregabalin Capsule 50 MG), the pharmacy is receiving less revenue per prescription than the NADAC cost. This signals that underwater claims experienced at the pharmacy could be some of the most profitable claims for the PBM and/or MCO. Additionally, 5 of the 10 medications we identify overlap with the medications identified by HPC in 2018.

The trend charts for the top spread drug, Entecavir Tablet 1 MG, has been provided in **Figure 5-12** on the following page to show how a high-spread drug operates in Massachusetts Medicaid managed care on a per-drug level. In this view, we compare the ingredient cost of the product, pharmacy reimbursement above ingredient cost, and the markup PBMs and/or MCOs take when transmitting the claim to Medicaid. Because the markup is so high, we elected to include the data table in this image to demonstrate that the majority of paid claim reimbursement for the pharmacy is incredibly small for this generic drug that is very expensive for Medicaid (due to the charge being billed to the state).



Figure 5-12: Entecavir Tablet 1 MG Spread Pricing Trend Chart (Q3 2018 to Q2 2019)

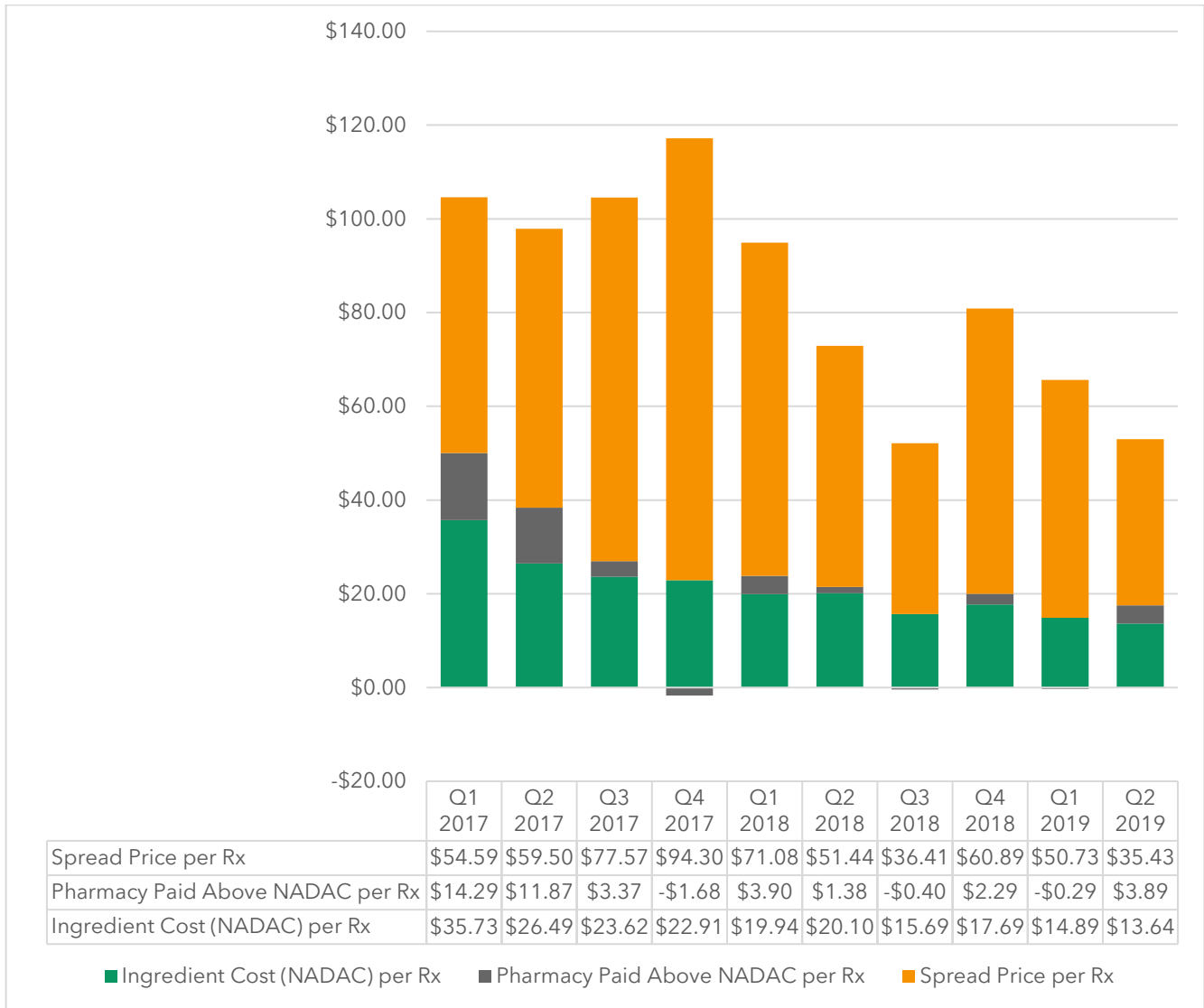


Source: CMS SDUD, Massachusetts; and 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid

Similar trends apply to the other medications on the top 10 list. Absent changes in policy, it is likely that as new generics come to market, such as the recent pregabalin generic alternative to Lyrica, Massachusetts Medicaid will continue to experience exaggerated generic pricing pressures at the likely expense of pharmacy provider reimbursements and at an increased cost to Massachusetts taxpayers.

The final example of spread pricing we provide relates to hydroxychloroquine. This older generic drug recently regained significant recognition due to the press it received related to the COVID-19 pandemic in 2020.<sup>59</sup> Hydroxychloroquine, the generic for Plaquenil, is a FDA-indicated medication for the treatment of malaria, lupus erythematosus, and acute and chronic rheumatoid arthritis. Preliminary reports of the potential role this medication may play in offering a treatment option for serious cases of COVID-19 led to a mad dash to acquire the product in March 2020.<sup>60</sup> It caused us to inquire whether the medication was associated with pricing distortions within the supply chain prior to this. We found that hydroxychloroquine also has a pricing spread in Massachusetts Medicaid (see [Figure 5-13](#) on the following page).

Figure 5-13: Hydroxychloroquine Tablet 200 MG Spread Pricing Trend Chart (Q3 2018 to Q2 2019)



Source: CMS SDUD, Massachusetts; and 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid

## 6 METHODOLOGY

### 6.1 DATA SOURCES

All analytics performed in this study were based on the combination of the following raw data sources:

1. CMS' State Drug Utilization Data (SDUD) database
2. CMS' National Average Drug Acquisition Cost (NADAC) database
3. Massachusetts Pharmacy Reimbursement Data
4. Medi-Span PriceRx by Wolters Kluwer Clinical Drug Information Inc. (WKCDI)

Details regarding these sources and the transformations made to the base data are provided within this section.

#### 6.1.1 CMS' State Drug Utilization Data (SDUD) Database

State agencies responsible for Medicaid operations are responsible for reporting drug utilization for covered outpatient drug expenditures incurred by their programs to the Centers for Medicare and Medicaid Services (CMS). Utilization is reported on a quarterly basis and published on Medicaid.gov approximately four months after the close of each quarter. This database is not a complete representation of all state expenditures under each state Medicaid program, as it excludes state-only programs (e.g., AIDS Drug Assistance Program) and purportedly also excludes 340B claims from 340B providers, as these are not included in the Federal State Medicaid Drug Rebate Program (MDRP).<sup>61</sup> Due to privacy concerns, the database also excludes any rows with counts less than 11. These exclusions are represented within the database as under "Suppression." The database includes data in the following format.

Table 6-1: SDUD Field Descriptions

Field Name	Description
Utilization Type	Constant "FFSU" or "MCOU." The FFSU Record ID indicates that the information for this National Drug Code (NDC) represents an FFS utilization record. The MCOU Record ID indicates that the information for this NDC represents a Managed Care Organization (MCO) utilization record. Valid values: 4Q2009 and earlier = Constant record ID of FFSU. 1Q2010 and beyond = FFSU & MCOU. Note: Per the Affordable Care Act, MCOU data cannot be reported for periods prior to 1Q2010.
State	Two-character postal abbreviation for state. Note: For any data where NDCs are aggregated (e.g., national totals), the state code is "XX" to represent multiple states.
Labeler Code	First segment of NDC that identifies the manufacturer, labeler, re-labeler, packager, re-packager, or distributor of the drug.
Product Code	Second segment of NDC.
Package Size Code	Third segment of NDC.
Year	Formerly "Period Covered" and was combined with Quarter "YYYYQ."
Quarter	Valid values are: 1 = January 1-March 31 2 = April 1-June 30 3 = July 1-September 30 4 = October 1-December 31 (Formerly "Period Covered" and was combined with Year "YYYYQ") Note: For FFS units, the Quarter/Year represents when the 11-digit NDC was paid for by the state. For MCO units: 2Q2017 and earlier, the Quarter/Year may either represent when the 11-digit NDC was dispensed or when it was paid for by the state; 3Q2017 and thereafter, the Quarter/Year represents when the 11-digit NDC was dispensed.

Field Name	Description
Product Name	First 10 characters of product name as approved by the Food and Drug Administration (FDA).
Suppression Used	The State Drug Utilization Data (SDUD) includes state, drug name, NDC, number of prescriptions, and dollars reimbursed. As CMS is obligated by the Federal Privacy Act, 5 U.S.C. Section 552a, and the HIPAA Privacy Rule, 45 C.F.R Parts 160 and 164, to protect the privacy of individual beneficiaries and other persons, all direct identifiers have been removed, and data that are less than 11 counts are suppressed. A checkmark in the "Suppression Used" column notes suppressed data. CMS applies counter or secondary suppression in cases where only one prescription is suppressed for primary reasons (e.g., one prescription in a state). Also, if one subgroup (e.g., number of prescriptions) is suppressed, then the other subgroups are suppressed.
Units Reimbursed	FFS units are the number of units (based on Unit Type) of the drug 11-digit NDC reimbursed by the state during the quarter/year covered. MCO units are the number of units (based on Unit Type) of the 11-digit NDC dispensed during the quarter/year covered.
Number of Prescriptions	The number of prescriptions should include any prescription for which Medicaid paid a portion of the claim, as well as those prescriptions for which Medicaid paid the claim in full. FFS: the number of prescriptions reimbursed by the state Medicaid agency as outpatient drug claims during the quarter/year covered. MCO: the number of prescriptions dispensed as outpatient drug claims during the quarter/year covered.
Total Amount Reimbursed	The FFS or MCO total amount reimbursed by both Medicaid and non-Medicaid entities to pharmacies or other providers for the 11-digit NDC drug in the period covered (two previous fields added together). Payments represent the amount on the claim and are not reduced or affected by Medicaid rebates paid to the state. This amount represents both federal and state reimbursement and is inclusive of dispensing fees. Note: As capitated payment arrangements are sometimes used by states and MCOs, a zero value in this field could be appropriate for MCO data; however, FFS utilization records will reject if this field is reported with a value of zero.
Medicaid Amount Reimbursed	The amount reimbursed by the Medicaid program ONLY to pharmacies or other providers for the 11-digit NDC by delivery system (FFS or MCO) in the quarter/year covered. This total is not reduced or affected by Medicaid rebates paid to the state. This amount represents both federal and state reimbursement and includes dispensing fees. Note: As capitated payment arrangements are sometimes used by states and MCOs, a zero value in this field could be appropriate for MCO data; however, FFS utilization records will reject if this field is reported with a value of zero.
Non-Medicaid Amount Reimbursed	The amount reimbursed by non-Medicaid entities to pharmacies or other providers for the 11-digit NDC by delivery system (i.e., FFS or MCO) in the quarter/year covered. The Non-Medicaid Amount Reimbursed includes any drug reimbursement amount for which the state is not eligible for federal matching funds.
Quarter Begin	Beginning date for quarter. Derived field provides ability to create comparisons over time. Can be used as a label for timelines.
Quarter Begin Date	Beginning date for quarter. Derived field provides ability to create comparisons over time. Also can be used to create timeline visualizations.
Latitude	Location within state. Derived from state code and provides ability to create maps and geographic comparisons.
Longitude	Location within state. Derived from state code and provides ability to create maps and geographic comparisons.
Location	Location within state. Derived from state code and provides ability to create maps and geographic comparisons.

*Source: CMS SDUD FAQs<sup>62</sup>*

For this report, we obtained SDUD data for Massachusetts as well as states we have previously analyzed and created reports for at 3 Axis (i.e., Florida, Illinois, Michigan, and New York). To support a comparison to national averages, we also included data associated with state "XX" (i.e., the national totals). This was accomplished via the following transact SQL statement:

```
WITH CTE AS (
SELECT *
FROM [SDUD].[dbo].[State_Drug_Utilization_Data_2014]
WHERE [State] = 'XX' OR [State]='MA' or [State]='FL' OR [State]='MI' OR [State]='NY' OR
[STATE]='IL'
UNION ALL
```

```

SELECT *
FROM [SDUD].[dbo].[State_Drug_Utilization_Data_2015]
WHERE [State] = 'XX' OR [State]='MA' or [State]='FL' OR [State]='MI' OR [State]='NY' OR
[STATE]='IL'
Union ALL
SELECT *
FROM [SDUD].[dbo].[State_Drug_Utilization_Data_2016]
WHERE [State] = 'XX' OR [State]='MA' or [State]='FL' OR [State]='MI' OR [State]='NY' OR
[STATE]='IL'
UNION ALL
SELECT *
FROM [SDUD].[dbo].[State_Drug_Utilization_Data_2017]
WHERE [State] = 'XX' OR [State]='MA' or [State]='FL' OR [State]='MI' OR [State]='NY' OR
[STATE]='IL'
UNION ALL
SELECT *
FROM [SDUD].[dbo].[State_Drug_Utilization_Data_2018]
WHERE [State] = 'XX' OR [State]='MA' or [State]='FL' OR [State]='MI' OR [State]='NY' OR
[STATE]='IL'
UNION ALL
SELECT *
FROM [SDUD].[dbo].[State_Drug_Utilization_Data_2019]
WHERE [State] = 'XX' OR [State]='MA' or [State]='FL' OR [State]='MI' OR [State]='NY' OR
[STATE]='IL' )

SELECT *
INTO SDUD.dbo.MA_PROJECT_SDUD
FROM CTE

```

As shown, we pulled data from Q1 2014 through Q2 2019 from CMS, which had last updated the data on March 13, 2020.

### 6.1.2 CMS' National Average Drug Acquisition Cost (NADAC) Database

NADAC was developed by CMS, “to provide a national reference file to assist State Medicaid programs in the pricing of Covered Outpatient Drug claims to reflect the actual acquisition cost (AAC) of drugs.”<sup>63</sup> As such, NADAC’s goal is to be the most comprehensive public measurement of market-based retail pharmacy acquisition cost available.

NADAC is compiled by Myers & Stauffer on behalf of CMS. It is generated from a voluntary monthly invoice cost survey of 2,500 randomly selected retail pharmacies (with 450 to 600 respondents). After Myers & Stauffer completes its data processing and cleanup activities, it publishes the survey results at the National Drug Code (NDC) level on Medicaid.gov. As of October 2019, the NADAC database included prices for 25,141 different NDCs. As state Medicaid FFS programs have shifted to an AAC basis to comply with the Covered Outpatient Drug Rule (CMS-2345-FC), many states have used NADAC as the primary proxy for acquisition cost. As a result, **we believe NADAC is the best publicly available pricing benchmark to approximate average pharmacy invoice costs.**<sup>f</sup> We relied on the NADAC database extensively throughout this report as the best estimate for a drug’s AAC.

NADAC information is provided in the following data format.

Table 6-2: CMS' NADAC Field Descriptions

Field Name	Description
NDC Description	Identifies the name, strength, and dosage form of the drug product.

<sup>f</sup> See [Appendix A: Assumptions, Limitations and Mitigating Factors](#) for NADAC limitations

Field Name	Description
NDC	The National Drug Code (NDC) is an 11-digit code maintained by the FDA that includes the labeler code, product code, and package code.
NADAC_per_Unit	The National Average Drug Acquisition Cost per unit.
Effective_Date	The effective date of the NADAC per Unit cost.
Pricing_Unit	Indicates the pricing unit for the associated NDC for pharmacy claims processing (ML, GM, or EA).
Pharmacy_Type_Indicator	The source of pharmacy survey data used to calculate the NADAC. C/I indicates data was collected from surveys of Chain/Independent pharmacies. Other pharmacy type indicators are not used at this time.
OTC	Indicates whether the NDC is for an over-the-counter (OTC) product (Y or N).
Explanation_Code	Codes that pertain to how the NADAC was calculated. • Code 1: The NADAC was calculated using information from the most recently completed pharmacy survey. • Code 2: The average acquisition cost of the most recent survey was within $\pm 2\%$ of the current NADAC; therefore, the NADAC was carried forward from the previous file. • Code 3: The NADAC, based on survey data, has been adjusted to reflect changes in published pricing, or as a result of an inquiry to the help desk. • Code 4: The NADAC was carried forward from the previous file. • Code 5: The NADAC was calculated based on package size. • Code 6: The CMS Covered Outpatient File drug category type of S/I/N (Single Source/Innovator/Non-Innovator) has not been applied. Most S/I drugs with the same strength, dosage form, and route of administration were grouped together for the purpose of the NADAC calculation, and N drugs were also grouped. In some cases, however, in calculating a NADAC, the CMS S/I/N designation was not applied when the state Medicaid brand or generic payment practices for these drugs generally differed from the CMS Covered Outpatient File designation. For example, authorized generic drugs are listed in the CMS Covered Outpatient File as I drugs for the purpose of rebates as they were approved under a New Drug Application (NDA). However, they are grouped as N for the NADAC calculation since they are generally designated as generic by most state Medicaid programs for the purposes of reimbursement. Another example of this occurrence is when proprietary named drugs, approved under an Abbreviated New Drug Application (ANDA), are in the CMS Covered Outpatient Drug file as N for the purpose of rebates. However, they are grouped as S/I for the NADAC calculation since they are generally reimbursed as brand drugs by state Medicaid programs. • Codes 7 through 10: Reserved for future use.
Classification_for_Rate_Setting	Indicates whether the NDC was considered brand (B) or generic (G) for the NADAC rate calculation process. If the NDC was considered B and approved under an Abbreviated New Drug Application (ANDA), the indicator is shown as B-ANDA.
Corresponding_Generic_Drug_NADAC_per_Unit	The NADAC for the corresponding generic drug.
Corresponding_Generic_Drug_Effective_Date	The effective date of when the Corresponding Generic Drug NADAC Per Unit is assigned to a multiple source brand drug NDC. This date may not correspond to the NADAC effective date for the generic drug due to the method by which the corresponding generic drug NADAC effective date is assigned. The corresponding generic drug NADAC effective date is the latter of the following dates: a) date of the NADAC reference file upon which the corresponding generic drug NADAC first appears; b) the current corresponding generic drug NADAC effective date plus one day (one day is added to the previous date so that there are no overlapping rate segments); or c) the NADAC Effective Date for the generic drug group. This data assignment process is necessary to eliminate the potential for applying corresponding generic drug NADACs to past claims.
As of Date	Survey date for which data is accurate.

Source: CMS NADAC<sup>64</sup>

### 6.1.3 Massachusetts Pharmacy Claim Data

With the assistance of the Massachusetts Independent Pharmacists Association (MIPA), 3 Axis identified 43 independent/small chain community pharmacies within Massachusetts to participate in this study. We obtained 7,943,357 pharmacy claims from Medicaid and non-Medicaid payers from these pharmacies in the following data format.

Table 6-3: Massachusetts Medicaid Drug Utilization Claim Field Descriptions

Field Name	Description
NPI	Provider National Provider Identifier (NPI) for the pharmacy
FILLDATE	Date of service
CLAIM IDENTIFIER	Identifier provided to link refills of a medication to original fill
RF	Refill number
NDC	National Drug Code
QTY_DSP	Dispensed quantity
P1_BIN	Primary payer Bank Identification Number (BIN)
P1_PCN	Primary Processor Control Number (PCN)
P1_GROUP	Primary payer group identification number
P2_BIN	Secondary payer BIN
P2_PCN	Secondary payer PCN
P2_GROUP	Secondary group identification number
P1_PAID	Primary payer paid amount
P2_PAID	Secondary payer paid amount
PATPAID	Patient paid amount (copayment)

Source: 3 Axis Advisors Column Headings

This was the source of data used to assess actual reimbursements to pharmacies and to assess the disparity between charge rates and pharmacy reimbursements.

No Personal Health Information (PHI) was collected as part of this study.

#### 6.1.4 Medi-Span PriceRx by Wolters Kluwer Clinical Drug Information Inc.

Medi-Span PriceRx is an online pricing and drug information portal developed by Wolters Kluwer Clinical Drug Information, Inc. (WKCDI). PriceRx offers one of the most extensive histories of drug manufacturer pricing, with NDC-level drug pricing dating back to the 1980s.<sup>65</sup> PriceRx was the source of the raw data that we used to calculate aggregated quarterly AWP and WACs for our analyses.

PriceRx also contains clinical information that enables identification of drug products by a hierarchical therapeutic classification system. This classification helps standardize drug lists and is the basis for all therapeutic category investigations. It was used to identify brand vs. generic status, prescription drug status, and therapeutic drug classes, among other clinical information.

Medi-Span information is not in the public domain and requires a subscription service to access the data and field descriptions.

## 6.2 DATA TRANSFORMATIONS

The following describes the transformations made to the data sources used in this report.

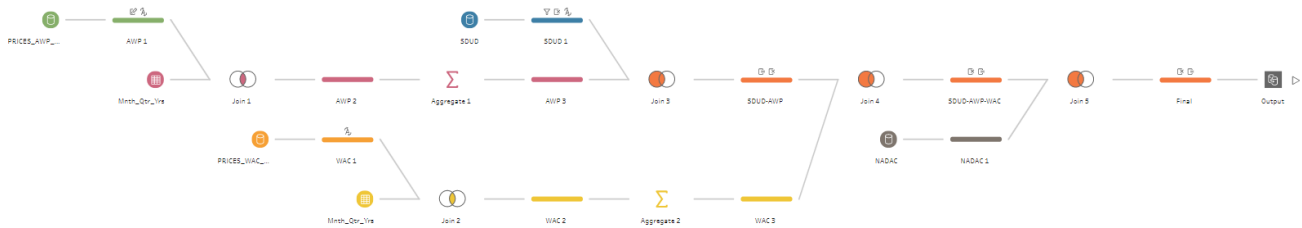
### 6.2.1 State Drug Utilization Data (SDUD)

We use CMS State Drug Utilization Data (SDUD) to have a benchmark to compare state expenditures for operating the optional prescription drug program within Medicaid to the acquisition costs of those medications by pharmacies, as well as to the reimbursement pharmacies receive for those medications by the state and its MCO partners. As SDUD is aggregated on a NDC, quarter, and year basis, the data only allows aggregate comparisons between data sets. To facilitate an appropriate aggregate comparison, we must average the various prescription drug pricing benchmarks (i.e., AWP, WAC, and NADAC) to a quarterly and yearly basis, and join the average price per unit to the



appropriate quarter and year for each NDC. Total costs at each pricing benchmark can be calculated on the basis of multiplying the number of units for each NDC by the appropriate average unit price.

Figure 6-1: SDUD Tableau Flow with Descriptions



Element	Type	Description	Element	Type	Description
Prices_AWP_...	Database	Contains all available AWP unit prices per NDC with effective and termination dates	Prices_WAC_...	Database	Contains all available WAC unit prices per NDC with effective and termination dates
AWP 1	Step	Changes data elements to support join	WAC 1	Step	Changes data elements to support join
Mnth_Qtr_Yrs	Database	Contains all dates from 10/1/1977 to 3/15/2021	Mnth_Qtr_Yrs	Database	Contains all dates from 10/1/1977 to 3/15/2021
Join 1	Inner Join	Joins AWP unit price for each NDC by all available dates	Join 2	Inner Join	Joins WAC unit price for each NDC by all available dates
AWP 2	Step	Step to review appropriate joins	WAC 2	Step	Step to review appropriate joins
Aggregate 1	Aggregation	Averages AWP price for NDC to each quarter and year	Aggregate 2	Aggregation	Averages WAC price for NDC to each quarter and year
AWP 3	Step	Step to review appropriate aggregation	WAC 3	Step	Step to review appropriate aggregation
SDUD	Database	Contains SDUD for MA, FL, IL, MI, NY, and XX	SDUD-AWP-WAC	Step	Calculates total WAC price for each NDC utilization by quarter and year
SDUD 1	Step	Changes data types to support join; removes suppressed data fields	NADAC	Database	Contains all available NADAC unit prices per NDC based upon survey dates and lagged to the appropriate quarter (see <a href="#">NADAC Lag</a> )
Join 3	Left Join	Left joins SDUD by NDC, year, and quarter to AWP unit price for the corresponding year and quarter	NADAC 1	Step	Step to review NADAC pricing data
SDUD-AWP	Step	Calculates total AWP for each	Join 5	Left Join	Left joins SDUD by NDC, year, and quarter

Element	Type	Description	Element	Type	Description
		NDC utilization by quarter and year			to NADAC unit price for the corresponding year and quarter
Join 4	Left Join	Left joins SDUD by NDC, year, and quarter to WAC unit price for the corresponding year and quarter	Final	Step	Removes duplicative fields from joins; calculates total NADAC price for each NDC utilization by quarter and year

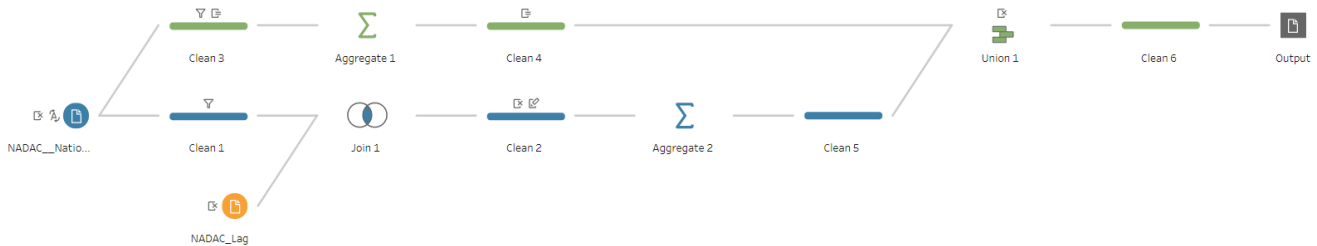
Source: 3 Axis Advisors Internal Database

## 6.2.2 NADAC Lag

Our goal is for the comparison between claim payment and AAC to be as meaningful as possible. As previously indicated, NADAC is our best estimate for actual acquisition costs for prescription drugs. For generic drugs, based on CMS’ survey methodology, we had to lag-correct the prices reported each week to bring them back to the right “pricing month” before we merged them with the SDUD.<sup>66</sup> Brand drug prices are collected by CMS differently, so they do not have to be lag-corrected.

To lag-correct NADAC generics, we created a lookup table with every date when NADAC was updated (“As of Date”) and assigned it a “pricing month.” NADAC is released every Wednesday to the public. Based on our studies, if this Wednesday falls on or after the 17th of any month, it reflects the acquisition prices two months prior. If it falls before the 17th, it likely reflects pricing from three calendar months prior. We used this logic to assign the pricing month to the weekly NADAC generic prices, before joining it with the prescription utilization data (either SDUD or pharmacy claims data). Figure 6-2 provides an overview of how the NADAC lag was accomplished.

Figure 6-2: NADAC Lag Tableau Flow with Descriptions



Element	Type	Description	Element	Type	Description
NADAC_Natio..	Database	Contains all available NADAC unit prices per NDC based upon survey dates	Clean 5	Step	Validates data to ensure aggregations were appropriate
Clean 1	Step	Filters NADAC to only generic drugs for the purpose of lagging the generic drugs	Clean 3	Step	Filters NADAC to only brand drugs for the purpose of averaging NADAC prices for brand-name drugs

Element	Type	Description	Element	Type	Description
NADAC_Lag	Database	Contains all NADAC survey dates and assigns them to the appropriate lag month, quarter, and year based upon the survey date	Aggregate 1	Aggregate	Averages NADAC unit price to year and month for each NDC
Join 1	Inner Join	Joins the NADAC_Nation.. database and NADAC_Lag database on the survey date	Clean 4	Step	Renames columns
Clean 2	Step	Removes duplicated columns of survey data due to join; renames columns	Union 1	Union	Merges brand and generic NDCs together
Aggregate 2	Aggregate	Averages NADAC unit price to year and month for each NDC	Clean 6	Step	Final step to assess database accuracy before output

Source: 3 Axis Advisors Internal Database

### 6.2.3 Pharmacy Claims Data

All de-identified pharmacy claims data from the 43 independent/small chain community pharmacies were joined with Medi-Span clinical field descriptions on a NDC basis based upon the following SQL statement:

```
SELECT [date_of_service]
, [rx_number]
, [fill_number]
, [ndc]
, [metric_decimal_qty]
, [primary_bin]
, [primary_pcn]
, [primary_group_id]
, [primary_paid_amount]
, [secondary_paid_amount]
, [final_patient_pay_amount]
INTO Claims.dbo.ALL_MA_CLAIMS_WITH_MEDISPAN_DEF
FROM [Claims].[dbo].[ALL_MA_CLAIMS] a
JOIN MediSpan.dbo.Definitions_20200203 b on a.ndc=b.NDC_UPC_HRI_Unformatted
```

This join removes claims not associated with Medi-Span drug definitions. Without these definitions, it is impossible to assess what product was dispensed, as no NDC description is otherwise available. The absence of these claims should not be interpreted to represent inappropriate pharmaceutical expenditures, as other drug reference files exist which may contain descriptions for these products (e.g., First Databank or Gold Standard Drug Database). This join removed 556,034 claims, or 7% of the total database.

The next step with the pharmacy data was to join drug reference prices to the claims data with definitions. Because the pharmacy claims contain specific dates of service for claims, it will not be necessary to join AWP and WAC unit prices on the basis of a quarterly average, as with the SDUD. Rather, these prices can be joined based upon the price in effect on the date of service according to Medi-Span, as per the following SQL statement (note that a left join is used to ensure records are not dropped due to the NDC on the claim not containing an AWP or WAC unit price):

```
SELECT a.*
      ,b.AWP_UNIT_PRICE
      ,c.WAC_UNIT_PRICE
INTO Claims.dbo.ALL_MA_CLAIMS_WITH_MEDISPAN_DEF_AWP_WAC
FROM [Claims].[dbo].[ALL_MA_CLAIMS_WITH_DEF] a
LEFT JOIN MediSpan.dbo.Prices_AWP b ON (a.ndc=b.ndc_upc_hri_unformatted) AND
(a.date_of_service >=b.history_effective_date AND a.date_of_service <=b.history_end_date)
LEFT JOIN MediSpan.dbo.Prices_WAC c ON (a.ndc=c.ndc_upc_hri_unformatted) AND (a.date_of_service
>=c.history_effective_date AND a.date_of_service <=c.history_end_date)
```

The next step was to connect the pharmacy data with definitions, AWP, and WAC unit prices to the NADAC unit price. [As previously identified](#), this was lagged to ensure the unit price was appropriate for a given month based upon the survey date for generic medications. This was accomplished with the following SQL statement (note again that this is a left join and ensures records are not dropped due to lacking a NADAC unit price):

```
SELECT a.*
      ,b.NADAC_UNIT_PRICE
INTO Claims.dbo.ALL_MA_CLAIMS_WITH_MEDISPAN_DEF_AWP_WAC_NADAC
FROM Claims.dbo.ALL_MA_CLAIMS_WITH_MEDISPAN_DEF_AWP_WAC a
LEFT JOIN MediSpan.dbo.Prices_NADAC_wLag b ON (a.ndc=b.ndc) AND (a.DOS_month =b.month AND
a.DOS_YEAR=b.year)
```

The final data transformation performed with the pharmacy claims data was to identify the paid pharmacy claims associated with Massachusetts’ Medicaid MCOs. This was accomplished by using MassHealth’s Pharmacy Facts, which identify the prescription BIN, PCN, and group for all MCOs within MassHealth. These are summarized in [Table 6-4](#).

Table 6-4: Rx BIN/PCN/Group Numbers for Massachusetts ACOs, MCOs, and PCC Plans<sup>67</sup>

Accountable Care Organizations (ACOs)	MCO Partner	PBM	BIN	PCN	Group
Be Healthy Partnership (HNE)	HNE	OptumRx	610593	MHP	HNEMH*
Berkshire Fallon Health Collaborative	Fallon	CVS Caremark	004336	ADV	RX6429
BMC HealthNet Plan Community Alliance	BMCHP	Envision	610342	BCAID	MAHLTH
BMC HealthNet Plan Mercy Alliance	BMCHP	Envision	610342	BCAID	MAHLTH

BMC HealthNet Plan Signature Alliance	BMCHP	Envision	610342	BCAID	MAHLTH
BMC HealthNet Plan Southcoast Alliance	BMCHP	Envision	610342	BCAID	MAHLTH
Fallon 365 Care	Fallon	CVS Caremark	004336	ADV	RX6430
My Care Family (NHP)	AllWays Health	CVS Caremark	004336	ADV	RX1653
Tufts Health Together with Atrius Health	Tufts	CVS Caremark	004336	ADV	RX1143
Tufts Health Together with BIDCO	Tufts	CVS Caremark	004336	ADV	RX1143
Tufts Health Together with Boston Children's ACO	Tufts	CVS Caremark	004336	ADV	RX1143
Tufts Health Together with CHA	Tufts	CVS Caremark	004336	ADV	RX1143
Wellforce Care Plan (Fallon)	Fallon	CVS Caremark	004336	ADV	RX6431
<b>Primary Care ACOs</b>	<b>MCO Partner</b>	<b>PBM</b>	<b>BIN</b>	<b>PCN</b>	<b>Group</b>
Community Care Cooperative (C3)	MassHealth	Conduent	009555	MASSPROD	MassHealth
Partners HealthCare Choice	MassHealth	Conduent	009555	MASSPROD	MassHealth
Steward Health Choice	MassHealth	Conduent	009555	MASSPROD	MassHealth
<b>MCOs</b>	<b>MCO Partner</b>	<b>PBM</b>	<b>BIN</b>	<b>PCN</b>	<b>Group</b>
BMC HealthNet Plan	BMCHP	Envision	610342	BCAID	MAHLTH
Tufts Health Together	Tufts	Caremark	004336	ADV	RX1143
<b>PCC Plan</b>	<b>MCO Partner</b>	<b>PBM</b>	<b>BIN</b>	<b>PCN</b>	<b>Group</b>
Primary Care Clinician (PCC) Plan	MassHealth	Conduent	009555	MASSPROD	MassHealth

\*Based upon a review of claims data, HNE was also accepted

Source: MassHealth Pharmacy Program Pharmacy Facts, March 1, 2018, and December 23, 2019

The following SQL statement was used to apply to each claim the proper MCO name based upon the information contained within **Table 6-4**:

```
ALTER TABLE [Claims].[dbo].[ALL_MA_CLAIMS_WITH_DEF_AWP_WAC_NADAC]
ADD MCO varchar(50)
```

```
UPDATE [Claims].[dbo].[ALL_MA_CLAIMS_WITH_DEF_AWP_WAC_NADAC]
SET MCO= CASE
```

```

WHEN (primary_bin LIKE '%610342%' AND primary_pcn like '%BCAID%' AND primary_group_id
like '%MAHLTH%') THEN 'BMCHP'
WHEN (primary_bin LIKE '%610593%' and primary_pcn LIKE '%MHP%' AND primary_group_id LIKE
'%HNE%') THEN 'HNE'
WHEN (primary_bin LIKE '%4336%' and primary_pcn LIKE '%ADV%' AND primary_group_id LIKE
'%RX6429%') THEN 'FALLON'
WHEN (primary_bin LIKE '%4336%' and primary_pcn LIKE '%ADV%' AND primary_group_id LIKE
'%RX6430%') THEN 'FALLON'
WHEN (primary_bin LIKE '%4336%' and primary_pcn LIKE '%ADV%' AND primary_group_id LIKE
'%RX1653%') THEN 'AllWays_HEALTH'
WHEN (primary_bin LIKE '%4336%' and primary_pcn LIKE '%ADV%' AND primary_group_id LIKE
'%RX1143%') THEN 'TUFTS'
WHEN (primary_bin LIKE '%4336%' and primary_pcn LIKE '%ADV%' AND primary_group_id LIKE
'%RX6431%') THEN 'FALLON'
WHEN (primary_bin LIKE '%9555%' and primary_pcn LIKE '%MASSPROD%' AND primary_group_id
LIKE '%MassHealth%') THEN 'MASSHEALTH'
ELSE 'OTHER' END

```

With these updates to the claims database, the data was uploaded into Tableau to perform data aggregations and calculations as per [Figure 6-3](#).

Figure 6-3: Massachusetts Pharmacy Claims Data Tableau Flow



Element	Type	Description	Element	Type	Description
ALL_MA_CLAI...	Database	Contains all available Massachusetts Pharmacy Claims data with clinical drug references, drug pricing references, and identified MassHealth MCOs	Clean 1	Step	Calculates total AWP, WAC, and NADAC price for each NDC utilization for each claim; calculates total payment amount for each claim by summing the amount paid by primary insurer, secondary insurer, and patient (via copay); calculates Margin over NADAC per-claim ranges; creates field which fixes Margin over NADAC to a maximum of \$10.02; identifies Clawback claims; creates an identifier for Medicare BIN and PCN

Source: 3 Axis Advisors Internal Database

## 6.3 DATA VALIDATION

### 6.3.1 Massachusetts Pharmacy Claim Data

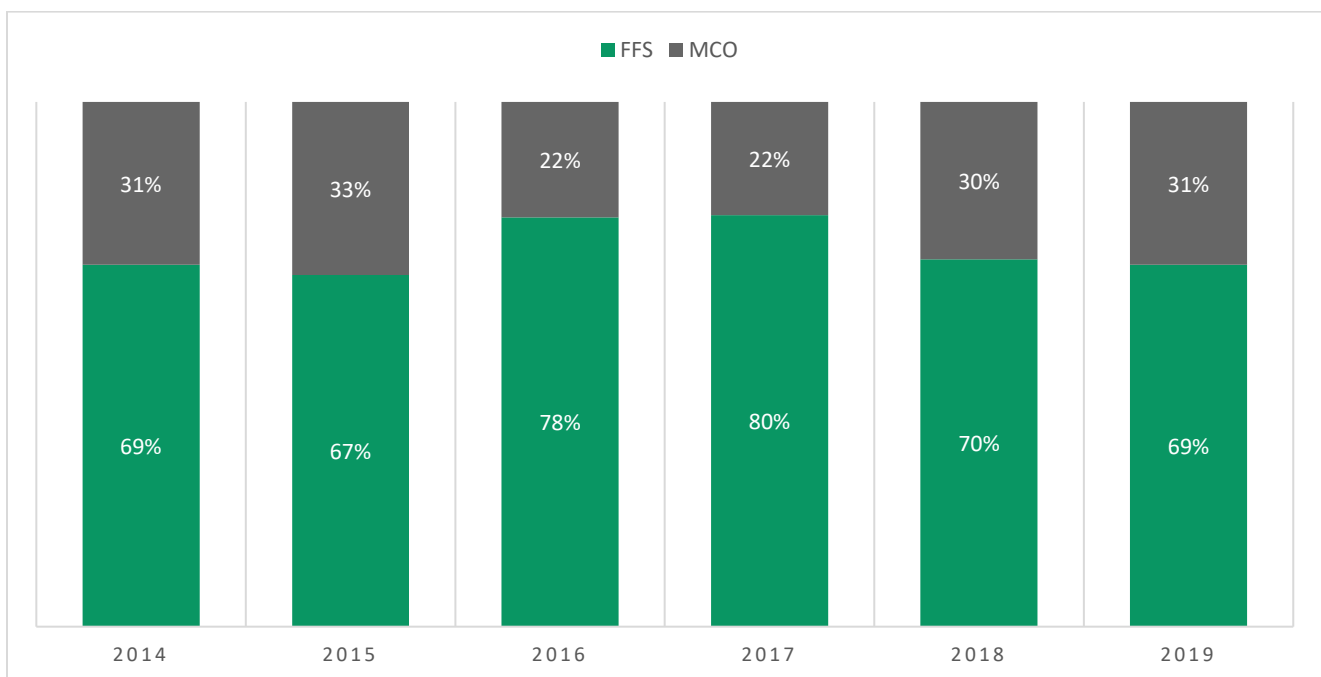
The first test performed with the pharmacy claims data was to ensure the received pharmacy claims data was a representative sample of the overall Massachusetts Medicaid population. To explore this,

we analyzed the percentage of Medicaid claims within the entire pharmacy claim sample along with the distribution of Medicaid claims by FFS and managed care, as well as within the various MCOs.

To start, based upon the identification of Medicaid claims by the BIN/PCN/Group provided by MassHealth (see [Table 6-4](#)), we identified 2,210,595 claims belonging to the Massachusetts Medicaid program within our pharmacy claim data set. Proportionally, this is 27.8% of claim volume for the 43 pharmacies. This is very close to the percentage of Massachusetts' total statewide population enrolled in Medicaid. Available data identifies 24% of Massachusetts' population is covered by Medicaid/Children's Health Insurance Program (CHIP) benefits as of October 2019.<sup>68</sup> The difference in pharmacy claim proportionality of 3.8% may be explained by higher average prescription utilization of a Medicaid/CHIP enrollee relative to the general population. So we have a high degree of confidence in our identification of Medicaid claims on the basis of MassHealth's Rx BIN/PCN/Group notice.

The next validation exercise we performed was an assessment of the ratio of claims within the FFS vs. managed care programs. Claims associated with MassHealth from the BIN/PCN/Group list were classified as FFS and compared to the combined total of all the other plans. The breakdown of FFS vs. managed care utilization over time within our pharmacy claims data is shown in [Figure 6-4](#).

**Figure 6-4: Massachusetts Pharmacy Claim Distribution by Medicaid Delivery System**

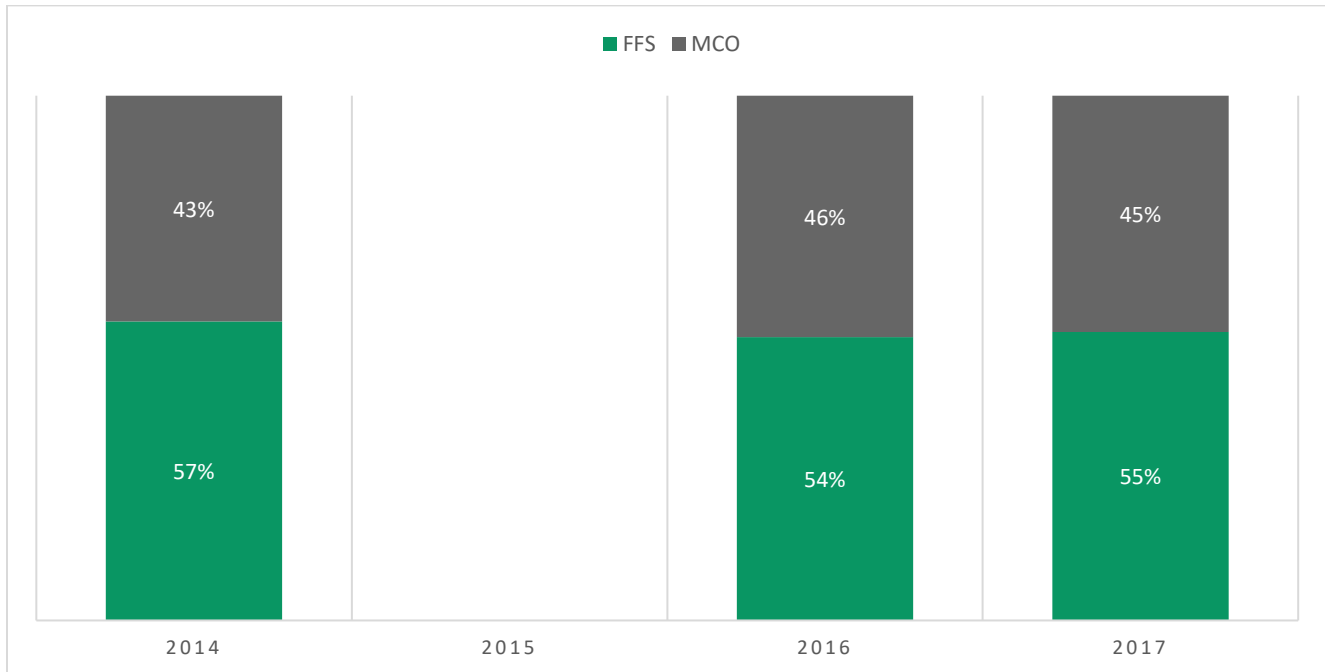


*Source: 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid*

Details regarding Massachusetts Medicaid enrollment dating back to 2015 could not be found. As a result, we are only able to compare Massachusetts MCO enrollment numbers to claims in 2014, 2016, and 2017. We find a higher percentage of MCO enrollees within Massachusetts data than what we observe in the claims data, as shown in [Figure 6-5](#).



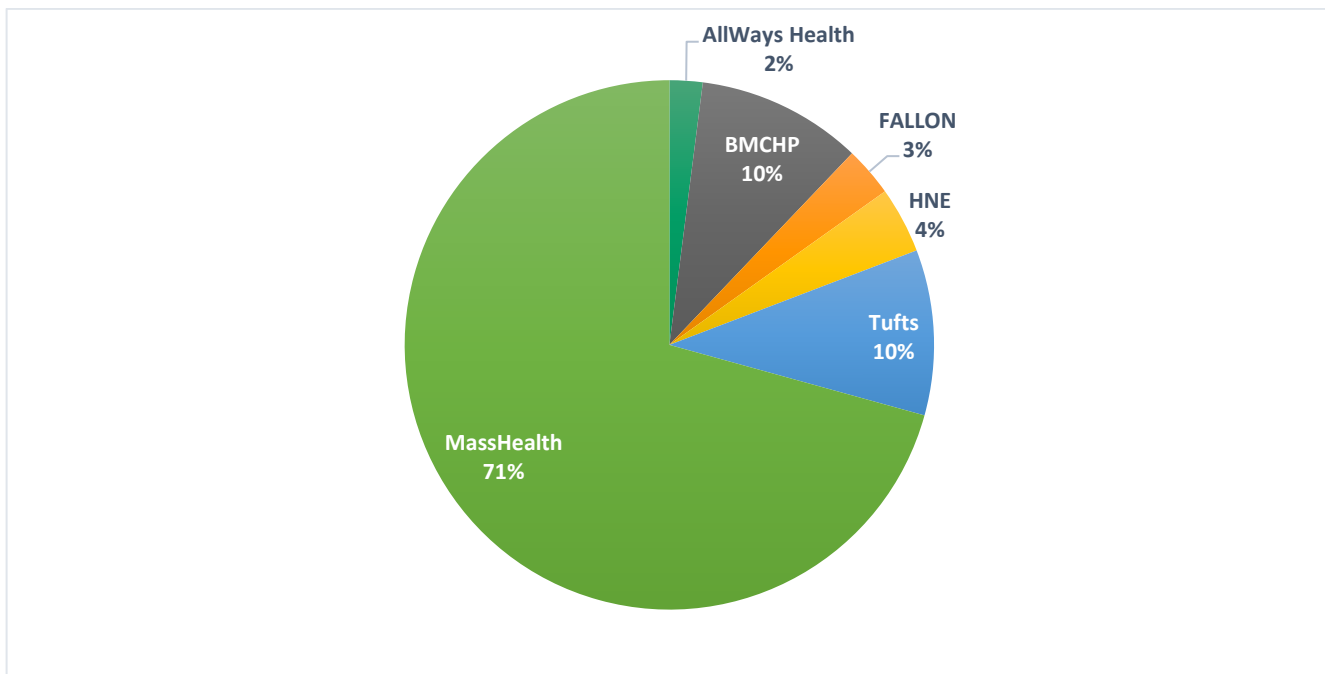
Figure 6-5: Massachusetts Enrollment Distribution by Medicaid Delivery System



Source: CMS Managed Care Enrollment Summary<sup>69</sup>

Overall, our pharmacy claims are distributed among the MCOs/ACOs shown in [Figure 6-6](#).

Figure 6-6: MCO Distribution within Pharmacy Claim Database, 2018-2019



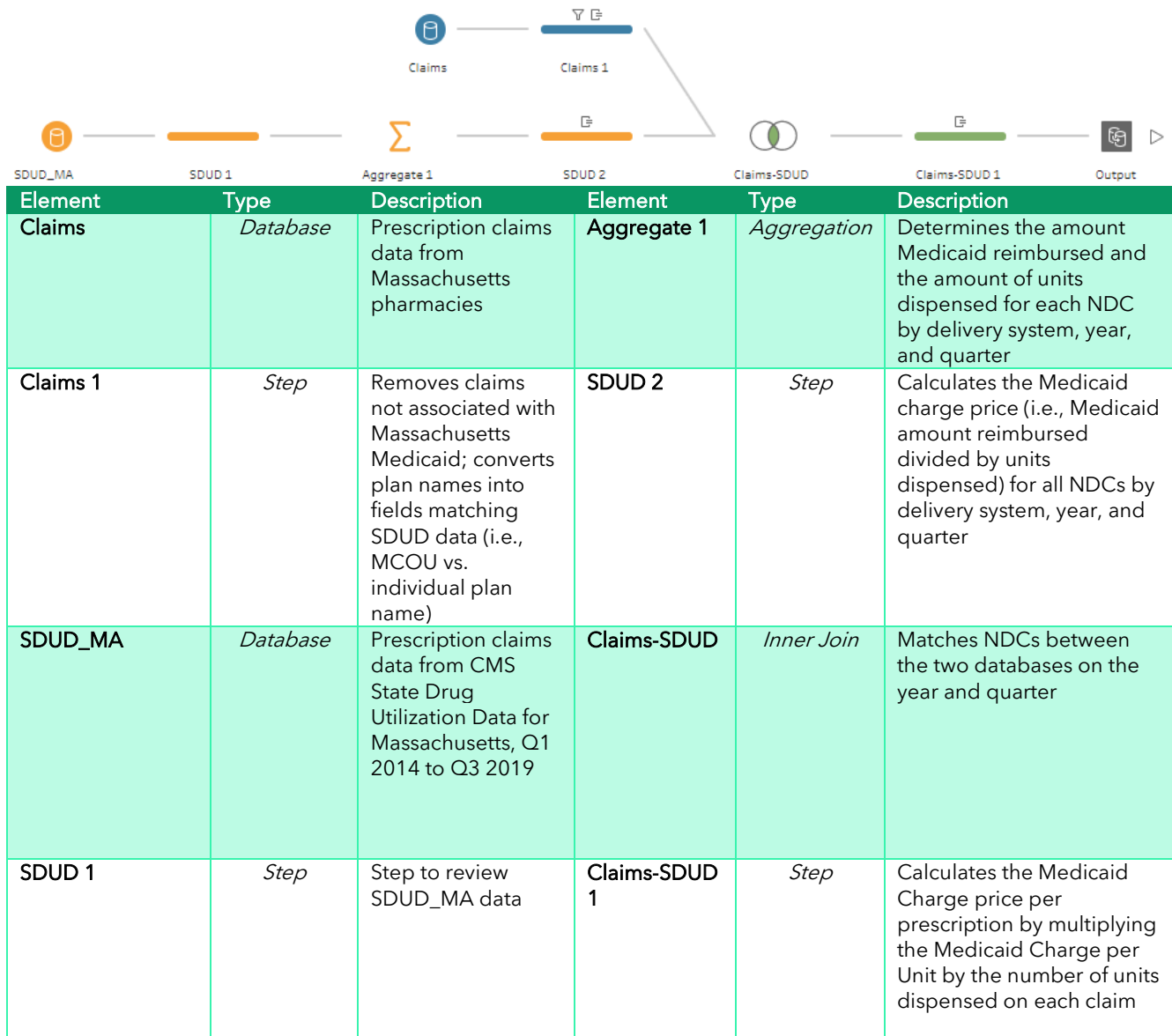
Source: 43 Massachusetts Independent and Small Chain Pharmacies' Claim Histories for Massachusetts Medicaid

No reports on Massachusetts' Medicaid program were found that analyzed the distribution of claims among MCOs or ACOs for the purpose of comparing our data distribution with that of the statewide average.

## 6.4 SDUD AND CLAIMS JOIN

The next step was to join the pharmacy claims database to the SDUD database to facilitate a comparison of payments by pharmacy provider to charges to MassHealth. This was accomplished via the Tableau flow shown in [Figure 6-7](#):

Figure 6-7: Massachusetts Pharmacy Claims and SDUD Database Join



Source: 3 Axis Advisors Internal Database

## 7 ABOUT 3 AXIS ADVISORS LLC

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3 Axis Advisors is an elite, highly specialized consultancy that partners with private and government sector organizations to solve complex, systemic problems and propel industry reform through data-driven advocacy. With a primary focus on identifying and analyzing U.S. drug supply chain inefficiencies and cost drivers, 3 Axis Advisors offers unparalleled expertise in project design, data aggregation and analysis, government affairs, and media relations. 3 Axis Advisors arms clients with independent data analysis needed to spur change and innovation within their respective industries. Co-founders Eric Pachman and Antonio Ciaccia were instrumental in exposing the drug pricing distortions and supply chain inefficiencies embedded in Ohio's Medicaid managed care program. They are also the co-founders of 46brooklyn Research, a nonprofit organization dedicated to improving the transparency and accessibility of drug pricing data for the American public. To learn more about 3 Axis Advisors, visit [www.3axisadvisors.com](http://www.3axisadvisors.com).

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## 8 ACKNOWLEDGMENTS

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A significant portion of our work at 3 Axis Advisors is reliant upon access to usable, publicly-available drug pricing data. Whether it be through CMS or individual states, it just so happens that state Medicaid program data is some of the best available. But the state of Massachusetts appears to be relatively unique among its sister states in that they have worked to provide more data and insights into their own Medicaid data, as well as into the commercial marketplace as well.

Through the Massachusetts All Payer Claims Database and the work of the Massachusetts Health Policy Commission, the Commonwealth has done a great service to their citizens and the nation as a whole by working to advance the public's knowledge base on prescription drug spending. Programs and agencies that expand access to data and enhance the public discourse are to be applauded and hopefully, replicated and improved upon by others.

We would also like to thank our home state of Ohio for first creating the culture of inquiry into the dynamics and details into pharmacy benefits and the prescription drug supply chain as a whole. If not for the work of the Columbus Dispatch, Attorney General Dave Yost, and several state lawmakers, these types of analyses would arguably not exist, and the status quo would frustratingly persist.

Additionally, we would like to thank the many pharmacies across the state of Massachusetts who have voluntarily turned over pharmacy claims data to help us better understand the dynamics at play in the Massachusetts Medicaid program.

## 9 APPENDIX A: ASSUMPTIONS, LIMITATIONS, AND MITIGATING FACTORS

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### 9.1 LIMITATIONS OF SDUD

CMS is obligated by the Federal Privacy Act, 5 U.S.C. Section 552a and the HIPAA Privacy Rule, 45 C.F.R Parts 160 and 164, to protect the privacy of individual beneficiaries and other persons. Consequently, CMS suppresses data that are less than eleven (11) counts. CMS applies counter or secondary suppression in cases where only one prescription is suppressed for primary reasons, e.g., one prescription in a state. Also, if one sub-group (e.g., number of prescription) is suppressed, then the other sub-group is suppressed. The database also does not include 340B claims per the data collection methodology.<sup>70</sup> The lack of 340B claims can be impactful in understanding Medicaid claim expenditures in relation to brand name medications. The suppression of low count claims can be significant if those claims are significantly divergent from the overall claim experience. Due to the nature of generic claims, which are 90% of utilization, the absence of claims due to suppression is likely to be of low impact to the analysis.

### 9.2 LIMITATIONS OF NADAC

NADAC's main limitation is that it does not include off-invoice rebates that pharmacies may receive from wholesalers. Rebates lower the net cost to the pharmacy for many drugs and tend to be a percent discount off the invoice cost if a pharmacy meets various generic purchasing targets with its primary wholesaler or pays its wholesaler bill on-time. As such, NADAC should not be viewed as a reflection of pharmacy *net* costs—these will vary depending on pharmacy size and wholesaler contract terms. Anecdotally, rebates on generic drug purchases can reach up to 30-40% of invoice cost for larger pharmacies, but this value is partly offset by wholesaler requirements that prevent the pharmacy from shopping with other wholesalers for the best invoice price. In other words, *there is nothing preventing the wholesaler from increasing the pharmacy's invoice cost to partly offset the rebate, resulting in an invoice cost that is above NADAC*. Smaller pharmacies, pharmacies that choose to shop more aggressively for better invoice costs, or pharmacies that are predominantly buying from smaller wholesalers may receive rebates that are considerably lower than 30-40%, or there may be no rebates at all. All told, 3 Axis Advisors' qualitative research suggests that net average pharmacy acquisition cost is some discount to NADAC, but not as large as 30-40%. We believe that the restrictions placed on pharmacies by wholesalers, combined with above-NADAC invoice costs, are offsetting some portion of the rebate.

A secondary limitation of NADAC is that the survey of retail pharmacies that it is based on is voluntary. Myers & Stauffer randomly selects and surveys ~2,500 pharmacies a month. Of this group, 450-600 pharmacies per month provide their acquisition costs, which become the basis for NADAC. Of course, to the extent that there are NDCs that have not been purchased by the 450-600 pharmacies that respond to the survey, NADAC will not capture these NDCs. In April 2017, CMS assessed the materiality of this limitation. They found that NADACs were calculated for approximately 96% of all Medicaid claim submissions—87% of brand claims, and 97% of generic claims.<sup>71</sup> This significant level of NDC coverage for generic drugs mitigates the risk introduced by the voluntary nature of the survey, in our view.

### 9.3 LIMITATIONS OF PHARMACY CLAIMS

Massachusetts Medicaid managed care programs are composed of more than one plan. As a result, our payer mix of MCOs may not be representative of the payer mix across the entire state making comparisons with SDUD data inaccurate to the degree the payer mix of our 43 pharmacies does not match the overall payer mix. It should be noted that we endeavored to obtain a large and diverse group of pharmacies to attempt to limit the impact of payer mix on our analysis as demonstrated by our data representing approximately 1 in 4 (23%) of independent pharmacies in the state as well as approximately 1 in 20 retail pharmacies (4%).

Another limitation of our claims data is that Rx BIN, PCN and Group numbers are imprecise numbers in claims transactions and storage. For example, a plan whose prescription benefit card indicates it may should be billed with an Rx BIN and PCN but a blank group may still accept claims with a group number transmitted. Another example would be a Group ID that is supposed to be billed under ADV may be accepted when billed under MCAIDADV. Failure to identify and account for these precision issues risks excluding a sub-set of claims from our analysis. We limited this error by relying upon the Rx BIN, PCN and Group numbers supplied by Massachusetts Medicaid.

A final limitation is our ability to identify commercial payers by removing Medicare and Medicaid payers based upon BIN and PCN group identifiers. While we have high confidence in appropriately identifying Medicaid payers based upon the information Massachusetts Health published on their website, we know that there is overlap between BIN and PCN groups within PBMs for Medicare and commercial payers. To the extent that the overlap exists, we are removing additional commercial payers from our analysis based upon the CMS Medicare BIN and PCN list. The impact of this to the analysis is unknown. Similarly, we are including within the final commercial payer analysis payer groups that would not be entirely representative of the commercial market. This includes payers such as workers' compensation, pharmacy discount cards, drug manufacturer coupons, etc. Again, lacking adequate commercial payer database to compare our findings to we are unable to quantify the extent to which these limitations impact the overall analysis.

## 10 APPENDIX B: GLOSSARY OF KEY TERMS

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- **340B Claims**

Pharmacies claims purchased at significant discounts under the program created by the Veterans Health Care Act of 1992 (i.e., 340B program). The law provides access to purchase drugs at reduced prices for certain healthcare entities called Covered Entities.

- **Actual Acquisition Cost (AAC)**

For a drug, the determination of the pharmacy providers' actual prices paid to acquire drug products marketed or sold by specific manufacturers.

- **Affiliated Pharmacies**

Pharmacies officially attached or connected to a Pharmacy Benefit Manager (PBM) or Managed Care Organization (MCO) often given preferred status to dispense selected medications (i.e., specialty prescriptions).

- **Average Wholesale Price (AWP)**

A prescription drug pricing benchmark that estimates the average price paid by a retailer to buy a prescription drug product from a pharmacy wholesaler. Note AWP is not a true representation of the actual market price to acquire prescription drug products

- **Charge per Unit**

The amount of money a health plan was charged per dose dispensed of a drug. For Massachusetts Medicaid we define this based upon the total Medicaid amount paid for a given NDC with the State Utilization Data (SDUD), divided by the number of units dispensed for the same NDC.

- **Clawback**

A PBM clawback occurs when the PBM requires a copay or cost share charge for the patient that is higher than the price the PBM negotiated with the pharmacy to dispense the drug. The pharmacy ends up collecting the required copay; however, the PBM keeps the difference between the excess patient payment and the payment to the pharmacy for itself. In other words, the PBM "claws back" the excess of the patient's copay.

- **Cost of dispensing (COD)**

The calculated amount of pharmacy costs incurred to ensure that possession of an appropriately covered outpatient drug is transferred to a Medicaid beneficiary. As per 42 CFR § 447.502, pharmacy costs included in this calculated amount include, but are not limited to, reasonable costs associated with a pharmacist's time in checking the computer for information about an individual's coverage, performing drug utilization review and preferred drug list review activities, measurement or mixing of the covered outpatient drug, filling the container, beneficiary counseling, physically providing the completed prescription to the Medicaid beneficiary, delivery, special packaging, and overhead associated with maintaining the facility and equipment necessary to operate the pharmacy.

- **Direct and Indirect Remuneration (DIR)**

A term used in Medicare Part D to identify price concessions that impact gross prescription drug costs not captured at the point of sale. They include but are not necessarily limited to discounts, chargebacks or rebates, cash discounts, free goods contingent on a purchase agreement, upfront payments, coupons, goods in kind, free or reduced-price services, grants, or other price concessions or similar benefits from manufacturers, pharmacies or similar entity.



- **Drug Mix**  
A term used to reflect the specific distribution of medications within a payer or pharmacy. Drug mix reflects the effect of patient choice on total cost as some medications may be more expensive than less expensive alternatives.
- **Effective rates**  
A contract where the full cost (reimbursement plus copay) of all drugs over a certain time frame must equal a certain percentage discount to a reference price, such as AWP. Usually the effective rate varies by the type of drug (i.e., brand vs. generic).
- **Fee-for-Service (FFS)**  
Medical and/or pharmacy claims where the state pays providers directly for the delivered healthcare service.
- **Generic Effective Rate (GER)**  
The relative rate of the full cost (reimbursement plus copay) of all generic drugs over a certain time frame as a percentage of the total weighted average AWP for those same brand drugs over the same time frame. Note reimbursement within certain prescription drug networks may be based upon a GER contract.
- **High Margin (Generic) Drugs**  
Any generic drug that was collectively priced by Massachusetts Medicaid managed care with a Margin over NADAC above the cost of dispensing in Massachusetts of \$10.02 per claim.
- **Health Insurance Portability and Accountability Act (HIPAA)**  
A US law designed to provide privacy standards to protect patients' medical records and other health information provided to healthcare providers.
- **Lower of Reimbursement**  
Payment for prescription drugs calculated as the lesser of the submitted charge by the provider or the calculated allowable charge by the payer (i.e., PBM).
- **Managed care organizations (MCOs)**  
Managed Care is a healthcare delivery system organized to manage cost, utilization, and quality. Medicaid MCOs provides for the delivery of Medicaid health benefits and additional services through contracted arrangements between themselves and state Medicaid agencies and accept a set per member per month (capitation) payment for these services.
- **Managed Medical Assistance (MMA) services**  
A term for the grouped services Florida contracts with managed care organizations (MCOs) to deliver within its Medicaid program. These include: Hospital, Professional, Maternity, Mental Health & Substance Abuse, Dental, Transportation, Pharmacy and Other State Plan Services.
- **Margin over NADAC**  
The amount of reimbursement provided by a health insurance carrier for a prescription drug relative to the NADAC based cost for the prescription drug based upon its national drug code (NDC).
- **Maximum Allowable Cost (MAC)**  
A payer or pharmacy benefit manager (PBM)-generated list of products that includes the upper limit that the payer will reimburse for a prescription drug product.
- **National Average Drug Acquisition Cost (NADAC)**  
A national prescription drug pricing benchmark that is reflective of the prices paid by retail community pharmacies to acquire prescription and over-the-counter covered outpatient drugs.

- **National Council of Prescription Drug Programs (NCPDP)**  
A not-for-profit, multi-stakeholder forum for developing and promoting industry standards, principally on the electronic exchange of information, and other business solutions that improve patient safety and health outcomes, while also decreasing costs.
- **National Drug Codes-NDCs**  
A unique, three-part segmented number published by the Food and Drug Administration (FDA) used to identify for drugs within the US Drug Supply chain.
- **Non-Preferred Drug**  
A drug that has been determined to have an alternative drug option that is clinically equivalent on a health plan's drug formulary. Non-preferred drugs generally have a higher cost to a patient to acquire than a preferred drug.
- **Oral Solid**  
An oral solid is a drug product with a route of administration of oral and a dosage form with a description including either capsule or tablet.
- **Pharmacy Benefit Manager (PBM)**  
A third-party administration of prescription drug programs for health plans whose responsibilities generally include developing and maintaining the formulary, contracting with pharmacies, negotiating discounts and rebates with drug manufacturers, and processing and paying prescription drug claims.
- **Preferred Drug**  
A preferred drug is a medication that has been clinically reviewed by a health plan. Preferred medications are generally chosen based upon its identified clinical and cost effectiveness. Preferred drugs generally have a lower cost to a patient to acquire than a non-preferred drug.
- **Preferred Drug List (PDL)**  
The list of specific medications within a prescription drug benefit that a payer has indicated are preferred relative to other medications in their therapeutic classification based upon their clinical significance and overall efficiencies.
- **Prior authorization (PA)**  
The act of seeking approval for certain medical and prescription drug plans from the health insurance carrier before they are paid for.
- **Professional Dispensing Fee (PDF)**  
Pharmacy costs associated with ensuring that the possession of the appropriate outpatient drug is transferred to a Medicaid beneficiary. These costs include, but are not limited to, the following:
  - Costs associated with checking the computer about an individual's coverage
  - Performing Drug Utilization Review and Preferred Drug List Review activities
  - Measurement or mixing of the drug
  - Filling the container
  - Beneficiary counseling
  - Physically providing the completed prescription to the Medicaid beneficiary
  - Delivery, special packaging and overhead associated with maintaining the facility and
  - Equipment necessary to operate the pharmacy
 (See 42 CFR § 447.502)<sup>72</sup>
- **Preferred Drug List (SPDL)**  
A preferred drug list (PDL) that uniformly applies to all programs, such as the various managed care organizations, within a state Medicaid program .

- **Rebates**  
A contractual relationship between a health plan and a drug manufacturer or other intermediary that generate financial value as a form of price concession paid by a pharmaceutical manufacturer to the health plan sponsor or the pharmacy benefit manager working on the plan's behalf.
- **Specialty Drugs / Medication**  
There is no industry recognized definition for specialty medication but PBMs generally identify drugs for inclusion on specialty medication lists they maintain based upon the drugs cost, administration, and handling requirements.
- **Specialty Pharmacy**  
Refers to pharmacy distribution channels designed to dispense specialty drugs.
- **Spread Pricing**  
The difference between the payments made by a pharmacy benefit manager (PBM) to the pharmacy for a prescription and the charge to the payer for the same claim.
- **State Drug Utilization Data (SDUD)**  
Since the start of the Medicaid Drug Rebate Program (MDRP), states report drug utilization for covered outpatient drugs paid for by state Medicaid agencies to the Centers for Medicare and Medicaid (CMS) who collects and distributes the data.
- **Therapeutic category**  
A group of drugs used in the management of a same or similar disease state.
- **True Up**  
A process to resolve any differences between a contractual reimbursement rate in a given agreement and the actual experienced reimbursement provided.
- **Underwater Claims**  
Pharmacy claims whose reimbursement from the health plan and/or PBM is below the ingredient cost to acquire for the medication dispensed.
- **Usual and Customary (U&C)**  
The amount charged to cash customers for the prescription exclusive of sales tax or other amounts claimed.
- **Withhold Amounts**  
Retained revenue within a contract until certain terms are met. In prescription claims processing these are generally represented as DIR fees but can include other contract guarantees a pharmacy must deliver in order to secure full reimbursement for claims.
- **Wholesale Acquisition Cost (WAC)**  
The list price paid by a wholesaler, distributor and other direct accounts for drugs purchased from the wholesaler's supplier.

## 11 DISCLAIMERS

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## 12 REFERENCES

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- <sup>1</sup> National Community Pharmacist Association (NCPA). (2017, Jan). NCPA Digest. Retrieved from <http://www.ncpa.co/pdf/digest/2017/2017-digest-lr.pdf>
- <sup>2</sup> National Council for Prescription Drug Programs (NCPDP). (Accessed 2020). Standards Transition. Retrieved from <https://www.ncpdp.org/Resources/Standards-Transition.aspx>
- <sup>3</sup> Agency for Healthcare Research and Quality (AHRQ) United States Health Information Knowledgebase (USHIK). (Accessed 2020). Total Amount Paid (Field# 509-F9). Retrieved from <https://usihk.ahrq.gov/ViewItemDetails?system=mdr&itemKey=127331000>
- <sup>4</sup> Medicaid and CHIP Payment and Access Commission (MACPAC). (2018, May). Medicaid Payment for Outpatient Prescription Drugs. Retrieved from: <https://www.macpac.gov/wp-content/uploads/2015/09/Medicaid-Payment-for-Outpatient-Prescription-Drugs.pdf>
- <sup>5</sup> 42 CFR § 447.502
- <sup>6</sup> 101 CMR 331.00
- <sup>7</sup> Medicaid and CHIP Payment and Access Commission (MACPAC). (2018, May). Medicaid Payment for Outpatient Prescription Drugs. Retrieved from: <https://www.macpac.gov/wp-content/uploads/2015/09/Medicaid-Payment-for-Outpatient-Prescription-Drugs.pdf>
- <sup>8</sup> Cahn, L. (2019, November 21). "Improving Ohio's Medicaid Prescription Coverage Program." Retrieved from [http://jmoc.state.oh.us/assets/meetings/Presentation%20to%20JMOC%20by%20Linda%20Cahn%20\(FINAL%2011-2-19\).pdf](http://jmoc.state.oh.us/assets/meetings/Presentation%20to%20JMOC%20by%20Linda%20Cahn%20(FINAL%2011-2-19).pdf)
- <sup>9</sup> Wolters Kluwer Clinical Drug Information, Inc. (2016). "U.S. Drug Price Data Policy." Retrieved from [https://www.wolterskluwercli.com/sites/default/files/documents/WKH\\_AWP\\_Policy.pdf](https://www.wolterskluwercli.com/sites/default/files/documents/WKH_AWP_Policy.pdf)
- <sup>10</sup> Curtiss FR., Lettrich P., Fairman KA. (2010, September 16). What is the price benchmark to replace average wholesale price (AWP)? Retrieved from <https://www.ncbi.nlm.nih.gov/pubmed/20726678>
- <sup>11</sup> Centers for Medicare & Medicaid Services. (2019, December 30). NADAC Equivalency Metrics. Retrieved from <https://www.medicare.gov/medicaid/prescription-drugs/downloads/retail-price-survey/nadac-equiv-metrics.pdf>
- <sup>12</sup> Centers for Medicare & Medicaid Services. (Accessed 2020). National Average Drug Acquisition Cost (NADAC) - NADAC Equivalency Methodology. Retrieved from <https://www.medicare.gov/medicaid/prescription-drugs/downloads/retail-price-survey/nadac-equiv-method.pdf>
- <sup>13</sup> Truven Health Analytics. (2004, February 17). Average Wholesale Price (AWP) Policy. Retrieved from [https://www.micromedexsolutions.com/micromedex2/4.31.0/WebHelp/RED\\_BOOK/AWP\\_Policy/AWP\\_Policy.htm](https://www.micromedexsolutions.com/micromedex2/4.31.0/WebHelp/RED_BOOK/AWP_Policy/AWP_Policy.htm)
- <sup>14</sup> Academy of Managed Care Pharmacy (AMCP). (2013, December). Maximum Allowable Cost (MAC) Pricing. Retrieved from <https://www.amcp.org/policy-advocacy/policy-advocacy-focus-areas/where-we-stand-position-statements/maximum-allowable-cost-mac-pricing>
- <sup>15</sup> 3 Axis Advisors. (2020, April 14). Assessing the responsiveness of Maximum Allowable Cost (MAC) prices to generic drug inflation. Retrieved from <https://www.3axisadvisors.com/projects/2020/4/14/responsiveness-of-maximum-allowable-cost-mac-prices-to-generic-drug-inflation>
- <sup>16</sup> Ohio Auditor of State. (2018, August 16). Auditor's Report: Pharmacy Benefit Managers Take Fees of 31% on Generic Drugs Worth \$208M in One-Year Period. Retrieved from <https://ohioauditor.gov/news/pressreleases/Details/5042>
- <sup>17</sup> Silverman, E. (2019, September 20). Spread Pricing: From Largely Unknown To Much Scrutinized and Criticized. Retrieved from <https://www.managedcaremag.com/archives/2019/9/spread-pricing-largely-unknown-much-scrutinized-and-criticized>
- <sup>18</sup> 3 Axis Advisors. (2019, December 10). Purple Haze: How a little purple pill called Nexium exposes big problems in the U.S. drug supply chain. Retrieved from [https://www.3axisadvisors.com/s/PurpleHaze\\_3AxisAdvisors\\_110719.pdf](https://www.3axisadvisors.com/s/PurpleHaze_3AxisAdvisors_110719.pdf)
- <sup>19</sup> DRG Adaptive. (n.d.). Home Page. Retrieved from <https://drgadaptive.com/>
- <sup>20</sup> Decision Resources Group. (2016). Rx Pricing. Retrieved from <https://web.archive.org/web/20170925114315/http://adaptive.com/solutions/rxpricing/>
- <sup>21</sup> Prabhu, N. (2019, March 15). State Medicaid Programs Take Firm Action Against PBM Spread Pricing. Retrieved from <https://decisionresourcesgroup.com/blog/state-medicare-programs-take-firm-action-pbm-spread-pricing/>
- <sup>22</sup> Office of the Insurance Commissioner Washington State. (2017, June). Study of the Pharmacy Chain of Supply. Retrieved from [https://www.insurance.wa.gov/sites/default/files/2017-06/pharmacy-supply-chain-study\\_0.pdf](https://www.insurance.wa.gov/sites/default/files/2017-06/pharmacy-supply-chain-study_0.pdf)
- <sup>23</sup> Causey LL. (2009). Nuts and Bolts of Pharmacy Reimbursement: Why it Should Matter to You. Retrieved from <https://www.law.uh.edu/healthlaw/perspectives/2009/LC%20Pharmacy.pdf>
- <sup>24</sup> Medicaid and CHIP Payment and Access Commission (MACPAC). (2018, May). Medicaid Payment for Outpatient Prescription Drugs. Retrieved from: <https://www.macpac.gov/wp-content/uploads/2015/09/Medicaid-Payment-for-Outpatient-Prescription-Drugs.pdf>
- <sup>25</sup> Centers for Medicare & Medicaid Services. "Medicaid Covered Outpatient Prescription Drug Reimbursement Information by State." Retrieved from <https://www.medicare.gov/medicaid/prescription-drugs/state-prescription-drug-resources/drug-reimbursement-information>
- <sup>26</sup> Myers and Stauffer Lc. (2017, February 7). Massachusetts Executive Office of Health and Human Services Survey of the Average Cost of Dispensing a Medicaid Prescription in the State of Massachusetts. Retrieved from <https://www.mass.gov/doc/cost-of-dispensing-survey-2017-0/download>
- <sup>27</sup> CFR § 447.518
- <sup>28</sup> Centers for Medicare & Medicaid Services. "Cost Sharing Out of Pocket Costs." Retrieved from: <https://www.medicare.gov/medicaid/cost-sharing/cost-sharing-out-pocket-costs/index.html>
- <sup>29</sup> MassHealth (2020). MassHealth Copayments Frequently Asked Questions. Retrieved from <https://www.mass.gov/service-details/masshealth-copayments-frequently-asked-questions>
- <sup>30</sup> Ibid
- <sup>31</sup> Centers for Medicare & Medicaid Services (CMS). (2020, March 13). State Drug Utilization Data. Retrieved from <https://data.medicare.gov/browse?category=State+Drug+Utilization&limitTo=datasets&sortBy=newest>

- 
- <sup>32</sup> 42 C.F.R. § 447.502
- <sup>33</sup> Gabler E. (2020, Jan 31). How Chaos at Chain Pharmacies is Putting Patients at Risk. Retrieved from <https://www.nytimes.com/2020/01/31/health/pharmacists-medication-errors.html>
- <sup>34</sup> 42 U.S.C. 1396r-8(d)(2)(K)
- <sup>35</sup> Center for Drug Evaluation and Research (CDER). (2005, May 23). Application Number: 21-845 Medical Review(s). Retrieved from [https://www.accessdata.fda.gov/drugsatfda\\_docs/nda/2005/021845s000\\_Revatio\\_mdr.pdf](https://www.accessdata.fda.gov/drugsatfda_docs/nda/2005/021845s000_Revatio_mdr.pdf)
- <sup>36</sup> Fein, A. (2019, August 7). Here's How PBMs and Specialty Pharmacies Snag Super-Size Profits from the 340B Program. Retrieved from <https://www.drugchannels.net/2019/08/heres-how-pbms-and-specialty-pharmacies.html>
- <sup>37</sup> 3 Axis Advisors. (2020, January 30). Sunshine in the Black Box of Pharmacy Benefits Management-Florida Medicaid Pharmacy Claims Analysis. Retrieve from <https://static1.squarespace.com/static/5c326d5596e76f58ee234632/t/5e384f26fc490b221da7ced1/1580748598035/FL+Master+Final+Download.pdf>
- <sup>38</sup> American Academy of Actuaries. (2018, March). "Prescription Drug Spending in the U.S. Health Care System." Retrieved from <https://www.actuary.org/content/prescription-drug-spending-us-health-care-system>
- <sup>39</sup> National Community Pharmacist Association (NCPA). (2017, Jan). NCPA Digest. Retrieved from <http://www.ncpa.co/pdf/digest/2017/2017-digest-lr.pdf>
- <sup>40</sup> Candisky C. (2019, April 30). Ohio Medicaid officials to crack down on PBM specialty drug practice. Retrieved from <https://www.dispatch.com/news/20190430/ohio-medicaid-officials-to-crack-down-on-pbm-specialty-drug-practice>
- <sup>41</sup> Academy of Managed Care Pharmacy (AMCP). (2013, December). Maximum Allowable Cost (MAC) Pricing. Retrieved from <https://www.amcp.org/policy-advocacy/policy-advocacy-focus-areas/where-we-stand-position-statements/maximum-allowable-cost-mac-pricing>
- <sup>42</sup> United Health Foundation. (2020). Annual Report. Retrieved from <https://www.americashealthrankings.org/explore/annual/measure/HealthInsurance/state/MA>
- <sup>43</sup> 46brooklyn. (2018, December 21). Slicing up the pie: New dashboard launched to track drug maker market share. Retrieved from <https://www.46brooklyn.com/news/2018/12/20/market-share-dashboard>
- <sup>44</sup> Candisky C., Rowland D. (2019, March 10). Overcharges on generic Prilosec give Ohio taxpayers heartburn. Retrieved from <https://www.dispatch.com/news/20190310/overcharges-on-generic-prilosec-give-ohio-taxpayers-heartburn>
- <sup>45</sup> 3 Axis Advisors. (2019, November 7). Purple Haze - How a little purple pill called Nexium exposes big problems in the U.S. drug supply chain. Retrieved from [https://static1.squarespace.com/static/5c326d5596e76f58ee234632/t/5def9d6dc4c5ef230178e095/1575984501347/PurpleHaze\\_3AxisAdvisors\\_110719.pdf](https://static1.squarespace.com/static/5c326d5596e76f58ee234632/t/5def9d6dc4c5ef230178e095/1575984501347/PurpleHaze_3AxisAdvisors_110719.pdf)
- <sup>46</sup> 42 U.S.C. 1396r-8
- <sup>47</sup> Ohn JA., Kaltenboeck A. (2019, August). Evolving Medicaid Coverage Policy and Rebates. Retrieved from <https://journalofethics.ama-assn.org/article/evolving-medicaid-coverage-policy-and-rebates/2019-08>
- <sup>48</sup> Langreth, R. (2019, April 9). Drug Middlemen Face State Probes Over Complex Pricing System. Retrieved from <https://www.bloomberg.com/news/articles/2019-04-09/drug-middlemen-face-state-probes-over-complex-pricing-system>
- <sup>49</sup> Gianforcaro, B. (2018, August 16). Auditor's Report: Pharmacy Benefit Managers Take Fees of 31% on Generic Drugs Worth \$208M in One-Year Period. Retrieved from: <https://ohioauditor.gov/news/pressreleases/Details/5042>
- <sup>50</sup> Sullivan L, Schladen, M. (2018, October 8). Taxpayers may be paying twice for the same Medicaid drug services. Retrieved from <https://www.dispatch.com/news/20181008/taxpayers-may-be-paying-twice-for-same-medicaid-drug-services>
- <sup>51</sup> Langreth, R. (2019, February 21). Drug Middlemen Took \$123.5 Million in Hidden Fees, State Claims. Retrieved from <https://www.bloomberg.com/news/articles/2019-02-21/drug-middlemen-took-123-5-million-in-hidden-fees-state-claims>
- <sup>52</sup> Maryland Department of Health. (2020, January 3). Maryland's 2019 Report on the Maryland Medical Assistance Program and Managed Care Organization that Use Pharmacy Benefit Managers - Audit and Professional Dispensing Fees. Retrieved from: <https://cdn.ymaws.com/www.marylandpharmacist.org/resource/resmgr/legislative/mcoauditreport.pdf>
- <sup>53</sup> Grassley, C, Wyden, R. (2019, July 23). Grassley, Wyden Introduce Major Prescription Drug Pricing Reform to Lower Costs for Americans. Retrieved from <https://www.grassley.senate.gov/news/news-releases/grassley-wyden-introduce-major-prescription-drug-pricing-reform-lower-costs>
- <sup>54</sup> Massachusetts Health Policy Commission. (2019, February 20). 2018 Annual Health Care Cost Trends Report. Retrieved from <https://www.mass.gov/doc/2018-report-on-health-care-cost-trends/download>
- <sup>55</sup> Massachusetts Health Policy Commission. (2019, June 5). HPC DataPoints, Issue 12: Cracking Open the Black Box of Pharmacy Benefit Managers. Retrieved from <https://www.mass.gov/info-details/hpc-datapoints-issue-12-cracking-open-the-black-box-of-pharmacy-benefit-managers>
- <sup>56</sup> 3 Axis Advisors. (2020, January 30). Sunshine in the Black Box of Pharmacy Benefits Management-Florida Medicaid Pharmacy Claims Analysis. Retrieve from <https://static1.squarespace.com/static/5c326d5596e76f58ee234632/t/5e384f26fc490b221da7ced1/1580748598035/FL+Master+Final+Download.pdf>
- <sup>57</sup> 3 Axis Advisors. (2019, April 28). Analysis of PBM spread pricing in Michigan Medicaid Managed Care. Retrieved from <https://static1.squarespace.com/static/5c326d5596e76f58ee234632/t/5cc5eb7b24a6944974537e28/1556474768436/3AA+MI+Medicaid+managed+care+analysis+-+Final+04.10.19.pdf>
- <sup>58</sup> 3 Axis Advisors. (2020, January 30). Sunshine in the Black Box of Pharmacy Benefits Management-Florida Medicaid Pharmacy Claims Analysis. Retrieve from <https://static1.squarespace.com/static/5c326d5596e76f58ee234632/t/5e384f26fc490b221da7ced1/1580748598035/FL+Master+Final+Download.pdf>

- 
- <sup>59</sup> World Health Organization (WHO). (2020, March 11). WHO Director-General's opening remarks at the media briefing on COVID-19. Retrieved from <https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19---11-march-2020>
- <sup>60</sup> Gold J, Khandai C, Lakshmin P, Turban J. (2020, March 25). No, These Medicines Cannot Cure Coronavirus. Retrieved from <https://www.nytimes.com/2020/03/25/opinion/coronavirus-drug-treatment-trump.html>
- <sup>61</sup> Centers for Medicare & Medicaid (CMS). (2018, February 15). State Drug Utilization Data (SDUD) FAQs. Retrieved from <https://www.medicare.gov/medicaid/prescription-drugs/state-drug-utilization-data/state-drug-utilization-data-faq/index.html>
- <sup>62</sup> Ibid
- <sup>63</sup> Center for Medicaid and CHIP Services & Myers and Stauffer LC. (2017, August 17). "CMS Retail Price Survey National Average Drug Acquisition Cost (NADAC) Overview and Help Desk Operations." Retrieved from <https://www.medicare.gov/medicaid/prescription-drugs/downloads/retail-price-survey/nadac-overview-operations.pdf>
- <sup>64</sup> <https://data.medicare.gov/Drug-Pricing-and-Payment/NADAC-National-Average-Drug-Acquisition-Cost-/a4y5-998d>
- <sup>65</sup> Wolters Kluwer Clinical Drug Information, Inc. (2020). "Comprehensive Price History Get a Fuller Pricing Picture ... All the Way Back to the '80s." Retrieved from: <https://www.wolterskluwercli.com/drug-data/drug-price-history/>
- <sup>66</sup> Centers for Medicare & Medicaid Services (CMS). (2020, February). NADAC (National Average Drug Acquisition Cost). Retrieved from <https://www.medicare.gov/medicaid-chip-program-information/by-topics/prescription-drugs/ful-nadac-downloads/nadacmethodology.pdf>
- <sup>67</sup> MassHealth Pharmacy Program. (2019, December 23). Pharmacy Facts#138. Retrieved from <https://www.mass.gov/lists/masshealth-pharmacy-facts#pharmacy-facts-2020->
- <sup>68</sup> Kaiser Family Foundation (KFF). (2019, October). Medicaid in Massachusetts. Retrieved from <http://files.kff.org/attachment/fact-sheet-medicare-state-MA>
- <sup>69</sup> Centers for Medicare & Medicaid (CMS). (2019, June 11). Managed Care Enrollment Summary. Retrieved from <https://data.medicare.gov/Enrollment/Managed-Care-Enrollment-Summary/tv8z-wdjd/data>
- <sup>70</sup> Centers for Medicare & Medicaid (CMS). (2018, February 15). State Drug Utilization Data (SDUD) FAQs. Retrieved from <https://www.medicare.gov/medicaid/prescription-drugs/state-drug-utilization-data/state-drug-utilization-data-faq/index.html>
- <sup>71</sup> Center for Medicaid and CHIP Services & Myers and Stauffer LC. (2017, August 17). "CMS Retail Price Survey National Average Drug Acquisition Cost (NADAC) Overview and Help Desk Operations." Retrieved from <https://www.medicare.gov/medicaid/prescription-drugs/downloads/retail-price-survey/nadac-overview-operations.pdf>
- <sup>72</sup> 42 CFR § 447.502