ANALYSIS OF PBM SPREAD
PRICING IN MICHIGAN MEDICAID
MANAGED CARE

Prepared for the Michigan Pharmacists Association (MPA)
1 EXECUTIVE SUMMARY

3 Axis Advisors estimates that Michigan Medicaid managed care manages at least $250 million a year in generic drug spending.\(^1\) Michigan’s Managed Care Organizations (MCOs) contract with Pharmacy Benefit Managers (PBMs) to collectively manage these funds. Recently, Ohio and Kentucky have found that the nature of these contracts between MCOs and PBMs result in a dynamic called “spread pricing,” in which the PBM “buys” a drug at a low cost from a pharmacy and “sells” the same drug at some higher cost to the MCO.\(^2,3\)

This project was commissioned by the Michigan Pharmacists Association (MPA) to assess the degree of generic drug spread pricing within Michigan’s Medicaid managed care program.

This study utilizes the most extensive sample of data we have collected to assess discrepancies between a state’s costs and its provider’s reimbursements. Working with SRS Pharmacy Systems, we collected deidentified, delocalized data\(^4\) from 451 community pharmacies across Michigan. Our sample represents nearly 20% of the 2,356 retail/community pharmacies in Michigan based on overall pharmacy counts presented in the 2017 National Community Pharmacists Association (NCPA) Digest.\(^5\) Ultimately, our spread pricing analysis is based on nearly two million prescriptions dispensed for oral solid generic drugs by Michigan pharmacies to Michigan Medicaid managed care beneficiaries between Q1 2016 and Q1 2018.

The key findings of this study related to spread pricing are:

- Weighted average oral solid generic drug costs in Michigan Medicaid managed care increased by 7% between Q1 2016 and Q1 2018, despite a (22%) decline in National Average Drug Acquisition Cost (NADAC) ingredient costs and a (28%) decline in pharmacy reimbursements
- Spread margin on oral solid generic drugs rose from only 2% of managed care’s cost in Q1 2016 to 34% of managed care’s cost in Q1 2018
- On an annual basis, spread margin on oral solid generic drugs rose from 6% of managed care’s cost in 2016 to 29% of managed care’s cost in 2017
  - Pharmacy margin over NADAC decreased (50%) while spread margin increased 389%
- By Q1 2018, pharmacies were reimbursed on average only $0.49 above NADAC for oral solid generic prescriptions dispensed within Michigan Medicaid managed care
  - This equates to only 5% of Michigan’s survey-based $10.64 per prescription cost to dispense for pharmacies

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\(^1\) Pre-rebate. Based on public state utilization data reported quarterly by Michigan to CMS. Totals derived from this database will underestimate overall state spending as they exclude suppressed NDCs (i.e. those NDCs that have less than 11 claims in a given quarter). Only includes generic drugs that are included in CMS’ National Average Drug Acquisition Cost (NADAC) database.


\(^4\) SRS Pharmacy Systems removed all protected health information (PHI) and pharmacy location identification from the data before it was provided to 3 Axis Advisors. SRS Pharmacy Systems assigned random number identifiers to each participating pharmacy to deidentify the participating pharmacy. 3 Axis Advisors has no knowledge of the identities of the pharmacies that participated in this study.

When compared to national-average managed care unit costs for behavioral health medications, Michigan saved over $20 million between Q2 2017 and Q1 2018 by carving out behavioral health medications to fee-for-service.

In answering our requestors’ research question on the degree of spread pricing in Michigan’s Medicaid managed care program, we used this opportunity to explain the plausible cause: the linkage of the state’s generic drug costs to a static, uncompetitively set benchmark price called Average Wholesale Price (AWP). Within this study, we provide evidence that AWPs for generic drugs:

1) Are set in a non-transparent, non-market-based manner
2) Do not capture market-driven cost deflation
3) Are experiencing upward (not downward) pressure over time

To eliminate the pricing distortions caused by the current model, we recommend that Michigan implement a transparent, full pass-through model within Medicaid managed care that is based on actual acquisition cost, plus a dispensing fee set by the state at a level that will ensure patient access and promote effective pharmacy competition. If the state opts instead to stay with the current model, we provide a series of recommendations to better align the state’s incentives with those of its contracted MCOs.

We hope that this study results in needed dialogue among state officials and lawmakers to begin fixing the inherent design flaws within its managed care program that are preventing the supply chain from delivering reliable long-term reduction in healthcare costs.
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4 Generic Effective Rate (GER)

As mentioned in the executive summary, we do not have access to the contracts between Michigan’s MCOs and their PBMs. 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). As such, our analysis of spread pricing in Michigan Medicaid managed care starts with an introduction of this concept.

GER measures the discount that the PBM contractually must deliver for its client to a benchmark called Average Wholesale Price, or AWP. The guarantee is normally applied over all multi-source generic drugs in a set time period as per the following equation:

\[
GER = 1 - \frac{\sum \text{Generic drug cost to payer}}{\sum \text{Generic drug AWP}}
\]

To illustrate, let’s say a payer requested individual claim history from its PBM for all generic drugs dispensed to its beneficiaries. To make this example very straightforward, this hypothetical payer only has five claims. Each of these five claims will be assigned a cost by the PBM based on a proprietary pricing list (possibly referred to as a Maximum Allowable Cost, or MAC, list). Oftentimes, the cost will be related to the acquisition cost of the generic drug, but unless expressly stated in the contract, the PBM is not required to link such cost to a market-based cost benchmark.

Continuing with our example, let’s say the aggregate AWP of all generic drugs dispensed to the payer’s beneficiaries over some period was $800. Let’s also assume that the payer’s contract with the PBM specifies that the PBM will deliver a GER of 85%. As such, it follows that the cost that the payer will pay for this basket of generic drugs will be $120.

As shown in Table 1, the GER of any individual drug can vary widely. The contractual commitment must hold over the payer’s entire generic mix during a given period.

<table>
<thead>
<tr>
<th>Drug</th>
<th>AWP</th>
<th>Cost</th>
<th>GER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generic A</td>
<td>$200</td>
<td>$60</td>
<td>70%</td>
</tr>
<tr>
<td>Generic B</td>
<td>$50</td>
<td>$10</td>
<td>80%</td>
</tr>
<tr>
<td>Generic C</td>
<td>$100</td>
<td>$3</td>
<td>97%</td>
</tr>
<tr>
<td>Generic D</td>
<td>$300</td>
<td>$15</td>
<td>95%</td>
</tr>
<tr>
<td>Generic E</td>
<td>$150</td>
<td>$32</td>
<td>79%</td>
</tr>
<tr>
<td>Overall</td>
<td>$800</td>
<td>$120</td>
<td>85%</td>
</tr>
</tbody>
</table>

The key learning from this illustration is that to the extent that Michigan MCOs have contracts with their PBMs that include GER language and commitments, actual realized drug prices are simply contingent on:
1) The aggregate AWP, and
2) The payer’s contracted discount to AWP

Again, unless it is expressly stated in the contract between a payer and a PBM, the price the payer pays for generic drugs may not be based upon actual drug costs. Because many payer contracts are based upon AWP, the question then becomes, “does AWP track actual costs of generic drugs?” If it does, then the payer would be purchasing drugs at least indirectly based on actual prices. If AWP does not track actual cost, this model could lead to considerable pricing distortions on generic drugs. So, the next logical step in our study was to evaluate how effective AWP is as a pricing benchmark for generic drugs.

5 Analysis of Average Wholesale Price (AWP)

To assess the effectiveness of AWP as a generic drug pricing benchmark, we designed a handful of small data analytics projects. Each project tests AWP in a different way to comprehensively assess its performance and limitations as a generic drug benchmark price.

5.1 AWP to NADAC Relationship

Key Learnings

- There is no correlation between a generic drug’s AWP and its market-based NADAC
- AWPs can be priced at more than 350 times a drug’s market-based NADAC

Implication for Payers

- Payers that are paying for generic drugs based on a discount to AWP have no guarantee that they are paying market rates for generic drugs
- The supply chain may have an incentive to keep AWP high if its generating revenue based on a percentage of AWP

The first analysis we conducted was a comparison of AWP to NADAC, that is the National Average Drug Acquisition Cost, for generic drugs dispensed within Michigan Medicaid. NADAC is a pricing benchmark derived from a monthly nationwide survey of retail community pharmacy covered outpatient drug prices provided by the Centers for Medicare and Medicaid (CMS). CMS has contracted with Myers and Stauffer, LC to conduct a survey of invoice prices from retail communities across the United States. As a result, it provides an objective measure of retail community acquisition costs, that is the invoice price they pay for their generic drugs. To accomplish this analysis, we joined the average AWP of each

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7 NADAC does not account for off-invoice discounts retail community pharmacies may receive for their drug purchases from their wholesaler
generic drug NDC together with its average NADAC\(^8\) for drugs dispensed by Michigan Medicaid for each quarter between Q1 2016 and Q2 2018. Figure 2 shows this relationship for generic drugs dispensed by Michigan. Each blue dot represents the AWP per Prescription and NADAC per Prescription for one generic drug.\(^9\)

Figure 2 - AWP versus NADAC, Michigan Medicaid generic drugs (Q1 2016 – Q2 2018)

Zooming into this chart (Figure 3) shows how truly random the relationship is between AWP and NADAC.

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\(^8\) We lag-adjusted NADAC to account for the lag inherent in Myers Stauffer’s survey of nationwide retail pharmacies.

\(^9\) We define a generic “drug” as all NDCs that have the same active ingredient, strength, and dosage form.
Another way of assessing this relationship is by viewing the AWP as a multiple of NADAC. In Figure 3, we divided the AWP by the NADAC for each generic drug dispensed over this period and plotted that against the number of prescriptions dispensed by Michigan Medicaid for that drug.

We’ve provided two examples to help illustrate how the chart is designed:

- The green bubble in the center of the figure represents Amlodipine 5 mg Tablet (generic Norvasc) in Q2 2018. In this quarter, Michigan Medicaid covered 38,332 dispensed prescriptions for this drug. The drug’s average NADAC per tablet in the quarter was just over $0.01 while its average AWP was $1.75, resulting in an AWP that was 127 times its NADAC; the NADAC was at a 99.21% discount to the AWP.

- The red bubble at the top of Figure 4 represents Meloxicam 15 MG tablet (generic Mobic) in Q2 2017. In this quarter, Michigan Medicaid covered 33,328 dispensed prescriptions for this drug. The drug’s average NADAC per tablet in the quarter was just under $0.02 while its average AWP was $7.70, resulting in an AWP that was 366 times its NADAC; the NADAC was at a 99.73% discount to the AWP in the quarter.

Overall, Figure 3 shows that AWPs of generic drugs dispensed within Michigan Medicaid over this 10-quarter period varied from being at parity to acquisition cost, to more than 350 times a drug’s acquisition cost.
The clear technical observations from the figures presented in this section is that NADAC is an extremely poor predictor of AWP. In other words, a drug’s actual market-based invoice acquisition cost cannot be used to predict the same drug’s AWP. This observation is confirmed by CMS’ own assessment of NADAC Equivalency Metrics.\textsuperscript{10} As shown in Figure 5, since Q3 2016, each consecutive quarterly assessment has shown an increasing percentage discount off average, measured both in terms of mean and median, AWP and NADAC.

It follows then that a payer that enters into an AWP-linked contract for generic drugs is not only not guaranteed to receive market-based pricing but is also subjected to a benchmark that is progressively drifting away from actual generic drug cost.

It is critical to note that to the extent that the supply chain is being compensated on a percentage of AWP, which in the aggregate is the case in a GER arrangement between a payer and a PBM, the supply chain theoretically has no incentive to lower AWPs — in fact, it’s likely the opposite. With GER being the prevailing model used to price drugs for payers, lowering the AWP would result in lower generic drug costs for the payer but also lower revenue for the PBM. This could explain why some AWP to NADAC multiples have reached such incredible heights. **This is the core hypothesis that we are working to test in this section.** Is the supply chain actively working to lower AWP, or to bring it up? All the following AWP analytics sub-sections provide different analytical experiments to get a better sense of the answer to this question.
5.2 Variance in AWP Pricing Across NDCs for the Same Drug

Key Learnings

- There is a significant amount of “AWP clustering” among manufacturers competing for market share within any given “unique” generic drug

Implication for Payers

- If the supply chain is paid based on a percentage of list price, drug manufacturers that set low list prices may be at a disadvantage in gaining market share. This could result in the price clustering we have observed.

When studying AWPs down to the NDC level, we noticed that a surprisingly large number of NDCs with the same active ingredient, strength, and dosage form (we will call this a “unique drug” going forward) had nearly identical AWPs. Take Morphine 100mg ER Tablet for example. In 2017, Michigan Medicaid dispensed eight different labelers. All eight labelers set the AWP for this drug at $9.20 per tablet (Table 2).

Table 2 - AWP per Unit (Morphine Sulfate 100mg ER Tablet)

<table>
<thead>
<tr>
<th>Labeler</th>
<th>2016</th>
<th>2017</th>
<th>Q1 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actavis, a Teva Company</td>
<td>$9.20</td>
<td>$9.20</td>
<td>$9.20</td>
</tr>
<tr>
<td>Mallinckrodt Pharmaceuticals</td>
<td>$9.20</td>
<td>$9.20</td>
<td>$9.20</td>
</tr>
<tr>
<td>Mayne Pharma</td>
<td>$9.20</td>
<td>$9.20</td>
<td>$9.20</td>
</tr>
<tr>
<td>Mylan Pharmaceuticals Inc.</td>
<td>$9.20</td>
<td>$9.20</td>
<td></td>
</tr>
<tr>
<td>Endo Generic Products</td>
<td>$9.20</td>
<td>$9.20</td>
<td>$9.20</td>
</tr>
<tr>
<td>Sun Pharmaceuticals</td>
<td>$9.20</td>
<td>$9.20</td>
<td>$9.20</td>
</tr>
<tr>
<td>Rhodes Pharmaceutical</td>
<td>$9.20</td>
<td>$9.20</td>
<td>$9.20</td>
</tr>
<tr>
<td>Zydus Pharmaceuticals (USA)</td>
<td>$9.20</td>
<td>$9.20</td>
<td>$9.20</td>
</tr>
</tbody>
</table>

Looking at the trend of the market-based NADAC (Figure 6) tells a different story about the actual cost of this drug.
We then designed an analysis to see how often this “AWP clustering” is happening across all generic drugs dispensed in Michigan Medicaid. We first grouped all NDCs with the same active ingredient, drug strength, and dosage form together (i.e. substitutable NDC grouping). We then found the minimum AWP and maximum AWP for all NDCs within each substitutable NDC grouping in Q2 2018. Then we simply divided the maximum by the minimum to get a rough feel for the disparity within any given drug.

To illustrate this calculation, let’s return to our Morphine 100mg ER Tablet example. As we have already established, there was no difference between the maximum and minimum AWP across all Morphine 100mg ER Tablet NDCs. It follows then that the maximum AWP divided by the minimum AWP is 1. On the opposite side of the spectrum is a drug like Pantoprazole 40mg DR Tablet (generic Protonix). The minimum AWP for this drug in Q2 2018 was $0.43 per tablet (produced by Prasco Laboratories) while the maximum AWP was $10.79 per tablet (produced by Amneal Pharmaceuticals). It follows then that the maximum to minimum ratio for this drug is 25.1. While this is a much healthier variance, drilling deeper, we can see that this drug still exhibits a significant degree of AWP clustering – it just has two outliers (Table 3).

Table 3 - Q2 2018 AWP per Unit (Pantoprazole 40mg Tablet)

<table>
<thead>
<tr>
<th>Marketer</th>
<th>Q2 2018 AWP per Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amneal Pharmaceuticals</td>
<td>$10.79</td>
</tr>
<tr>
<td>Aurobindo Pharma USA Inc.</td>
<td>$5.27</td>
</tr>
<tr>
<td>Camber Pharmaceuticals Inc</td>
<td>$5.27</td>
</tr>
<tr>
<td>Mylan Pharmaceuticals Inc.</td>
<td>$5.27</td>
</tr>
<tr>
<td>Dr. Reddy's Laboratories, Inc.</td>
<td>$4.09</td>
</tr>
<tr>
<td>Cadista Pharmaceuticals</td>
<td>$4.09</td>
</tr>
<tr>
<td>Teva Pharmaceuticals USA</td>
<td>$4.09</td>
</tr>
<tr>
<td>Torrent Pharma, Inc</td>
<td>$4.08</td>
</tr>
<tr>
<td>Kremers Urban Pharmaceuticals Inc.</td>
<td>$4.06</td>
</tr>
<tr>
<td>Prasco Laboratories</td>
<td>$0.43</td>
</tr>
</tbody>
</table>
We limited our analysis to generic drugs that had three or more marketers and excluded all NDCs that were marketed by a “repackager”\(^\text{11}\). After applying these filters, we were left with 975 different generic “drugs” dispensed through Michigan Medicaid in Q2 2018. \textit{Figure 6} shows that of all these generic drugs, 50% had a less than 10% difference between the maximum and minimum AWP within the drug group. 29% of the drugs had less than a 2.5% difference, and 18% of the drugs resembled Morphine 100mg ER Tablet – drugs with full AWP clustering across all substitutable NDCs (\textit{Figure 7}).

\textit{Figure 7 - AWP Clustering Analysis, Michigan Medicaid Generic Drugs, Q2 2018}

\begin{center}
\textbf{Analysis of Maximum vs. Minimum AWP for Generic Drugs Dispensed in Michigan Medicaid in Q2 2018}
\end{center}

This analysis raises serious questions around how manufacturers are setting their Suggested Wholesale Prices (SWP)\(^\text{12}\) for drugs. We believe that it is highly unlikely that these prices are being set in a competitive manner given the level of clustering we have identified.

We should note that this observed pricing behavior makes logical sense given the current incentive structure of the generic drug supply chain. As noted in the prior section, the supply chain is often compensated on a percentage of AWP. Theoretically, based on this current model, if a manufacturer that set its AWP dramatically lower than its competitors, it would have an unfavorable impact on the supply chain’s revenue, potentially putting the manufacturer’s market share at risk. This could be one of the drivers behind the significant SWP clustering among manufacturer pricing. This theory is supported by at least one ongoing active lawsuit by the Attorney Generals of 20 states regarding generic drug price fixing schemes involving some of the labelers identified above.\(^\text{13} \, 14\)

\begin{itemize}
\item \textit{Note:} A repackager redistributes a different manufacturer’s drug under a different brand.
\item \textit{Note:} Manufacturers report Suggest Wholesale Price to pricing compendia such as MediSpan, First Databank, and Elsevier Gold Standard. Those companies then report these either as “AWP” or “SWP.” As such, the two are functionally interchangeable.
\item \textbf{Note:} \url{https://nj.gov/oag/newsreleases17/GDMS-First-Amended-Complaint.pdf}
\item \textbf{Note:} \url{https://www.businessinsider.com/antitrust-suit-accuses-drug-companies-working-together-increase-generic-prices-2018-12}
\end{itemize}
5.3 Changes to Manufacturer AWP over Time

Key Learnings

- Manufacturers are not bringing down generic SWPs in line with market-driven generic drug deflation
- Manufacturers are more likely to bring up SWPs with a market-driven price increase than to bring down SWPs with a market-driven price decrease

Implication for Payers

- Without any downward market-based adjustments to AWP, payers in an AWP-linked model will not directly see the benefits of competition-driven generic deflation
- AWPs for individual NDCs are likely to experience upward pressure over time

If manufacturers truly do not have the incentive to bring down drug AWPs, we would also expect to see few changes to their AWPs over time, even against a backdrop of accelerating deflation in actual market-driven costs. We tested this theory in this section.

To set up this analysis, we exported all generic drug NDCs that were dispensed through Michigan Medicaid in both Q1 2016 and Q1 2018. Overall, we found a total of 6,436 NDCs that had positive volume in both quarters. We then analyzed the price changes on all NDCs over this two-year period. Figure 8 shows the results of this analysis. Of this sample of generic NDCs, 6,085 or 94.5% experienced no change in AWP over this two-year period. This contrasts starkly with the change in NADAC – 4,908 or 76.2% declined in actual price over this period. The average decline in NADAC over two years for all drugs in the group was 17%. The same group of drugs experienced a 1% increase in AWP over the same period.

Figure 8 - Change in AWP and NADAC between Q1 2016 and Q1 2018, MI Medicaid Generic Drugs

Change in AWP and NADAC between Q1 2016 and Q1 2018 for Generic Drugs dispensed in Michigan Medicaid (n = 6,436)
We then drilled deeper into only those drugs that experienced an increase or decrease in NADAC over this period (4,908 drugs that experienced a decline, and 463 drugs that experienced an increase). Our interest was if manufacturers were more likely to increase AWPs when actual price increased (i.e. a drug shortage) than decrease AWP when actual price decreased (i.e. competition-driven generic price deflation). If this is true, this could put upward pressure on AWPs over time as the market-driven increases to price cascade through to AWP, but not the market-driven decreases to price.

Figure 9 shows the results of this analysis. Sure enough, drugs that experienced an increase in NADAC are much more likely to increase in AWP than drugs experiencing a decrease in NADAC are to decrease in AWP. The left stacked bar shows that generic manufacturers increased the AWP of 25.7% of the NDCs that experienced a market-driven price increase. The right stacked bar shows that generic manufacturers only decreased the AWP of 1.8% of the NDCs that experienced a market-driven price decrease.

The most common driver, in our view, of any market-driven price increase is a drug shortage. In June 2018, the American Medical Association (AMA) “adopted a policy declaring drug shortages an urgent public crisis” and “urge(d) Department of Health and Human Services and the Department of Homeland Security to examine drug shortages as a national security initiative.” To provide better context into how shortages can impact a drug’s AWP and NADAC, Figure 10 looks at West-Ward Pharmaceuticals’ Lidocaine 4% Topical Solution. According to the American Society of Health-System Pharmacists (ASHP), this drug was on shortage from February 2017 through October 2017. However, West-Ward’s product (NDC = 00054-3505-47) was marked as “available.” Nonetheless, as shown in Figure 10, the quarter-average AWP increased from $0.37 per unit to $0.96 per unit.

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On the other end of the spectrum, the driver of generic deflation is increased competition. Figure 11 presents Entecavir 0.5mg Tablet (generic Baraclude) manufactured by Camber Pharmaceuticals. At the start of 2016, there were four FDA-approved manufacturers of this drug. By the end of 2017, this doubled to eight, resulting in an 82% decline in the market-driven NADAC ($22.87 per tablet to $4.11 per tablet). However, as was the case with 96.1% of all drugs that experienced a decline over this period, the quarter-average AWP of this NDC was unchanged.
As posited earlier, the notion that AWPs would be more likely to move higher with unfavorable changes in market pricing than they would be to move lower with favorable changes to market pricing should be concerning for payers. This inherently puts upward pressure on drug costs for any payer that is paying for drugs based on AWP.

5.4 ANALYZING MIX SHIFT ACROSS NDCS WITHIN SAME DRUG

Key Learnings

- Overall, Michigan has experienced a net unfavorable mix shift within its unique drugs from lower AWP to higher AWP NDCs

Implication for Payers

- Payers must provide the correct incentive for PBMs to switch dispensing to the lowest cost drug, or at least monitor NDC mix within unique drug groups to ensure they are not overpaying for specific NDCs
- Unfavorable NDC mix shift is another factor that appears to be putting upward pressure on generic AWPs over time

The prior section concluded that AWPs of individual NDCs likely are facing upward pressure. But there is another potential source of AWP pricing pressure that payers should be aware of. As we established in Figure 7, 50% of Michigan’s generic drugs had a greater than 10% spread between the maximum AWP NDC and the minimum AWP NDC within the drug’s collection of substitutable NDCs. Pantoprazole 40mg DR Tablet (generic Protonix) was one of the drugs with a very wide variation between minimum and maximum AWP. The warped economic incentives inherent in the supply chain to lift AWP (discussed on page 12) leads to a hypothesis that when a drug has considerable variability in AWPs across all substitutable NDCs available for that drug, the supply chain will work to dispense the high-AWP NDC over the low-AWP NDC, leading to an unfavorable mix shift for the payer.

We assessed this for Michigan Medicaid managed care’s dispensing of Pantoprazole 40mg DR Tablet. As discussed earlier, the majority of the Pantoprazole NDCs are clustered between $4 and $6 per tablet, with two outliers – Prasco’s at $0.43-0.45 per tablet and Amneal’s NDCs at $10.79 per tablet. As such, in Figure 12, we created three buckets for this drug – NDCs less than $0.50 per tablet, NDCs between $4 and $6 per tablet, and NDCs above $10 per tablet. We then looked at Michigan Medicaid managed care dispensing of this drug by AWP grouping between Q1 2016 and Q2 2018. In Q1 2016, 10% of Michigan Medicaid managed care’s prescriptions were dispensed through low-cost NDCs. There was no volume dispensed through NDCs that cost more than $10 per tablet. By Q2 2018, the $10+ tablet NDC volume was up to 16% of Michigan Medicaid managed care’s mix and <$0.50 tablet dispensing was down to less than 1%. The net effect of this mix shift resulted in a 26% increase to weighted average AWP per unit for this drug in Michigan Medicaid managed care, despite no changes to the AWP of any individual NDC.
Our next task was to design an analysis to more holistically test this theory in Michigan Medicaid managed care. To do this, we worked through the following steps:

1) Exported every generic NDC dispensed by Michigan Medicaid managed care in both Q1 2016 and Q1 2018, along with each NDC’s AWP and utilization in each of the two quarters
2) Grouped all NDCs by active ingredient, strength, and dosage form (i.e. “unique drug”)
3) Removed all NDCs that experienced a price change between the two quarters – this allowed us to isolate the mix impact of the change in utilization within each unique drug
4) Removed all generic drugs that did not have at least three manufacturers
5) Calculated the weighted average AWP for each unique drug in both periods

The results of this analysis are shown in Figure 13. We found that the weighted average AWP for 44% of unique generic drugs increased, 37% of unique drugs decreased, and 19% did not change over this period. Of the unique drugs that increased in AWP, the weighted average increase was 3.5%. Of the unique drugs that decreased in AWP, the weighted average decrease was (2.5%). This analysis indicates that Michigan Medicaid managed care has experienced a net unfavorable mix impact due to NDC utilization changes within unique drug groups.
6 AWP IN MICHIGAN MEDICAID MANAGED CARE

If nothing else, the preceding 13 pages of AWP analysis has strongly indicated that:

1) AWPs for generic drugs are set in a non-transparent, non-market-based manner
2) AWPs for generic drugs do not capture market-driven cost deflation
3) There is risk that the economic incentives embedded in the current design of the drug supply chain could be putting upward pressure on generic AWPs over time

History provides an important context to these concerns. Less than a decade ago, major participants in the drug channel were involved in, and ultimately settled, litigation related to AWP price fixing. In quick summary, the litigation asserted that defendants First DataBank, Inc. (“FDB”), a drug pricing publisher, and McKesson Corporation, a drug wholesaler, engaged in a racketeering enterprise to fraudulently increase the published “average wholesale price” (“AWP”) of over four hundred branded drugs by five percent from late 2001 to 2005 in violation of 18 U.S.C. § 1962 and state law. What some experts had identified as signaling the end of ‘ain’t what’s paid’ AWP pricing formulas seems to have failed to solve the drug channel’s addiction to artificial price benchmarks as a basis for reimbursement.

17 https://www.govinfo.gov/content/pkg/USCOURTS-mad-1_05-cv-11148/pdf/USCOURTS-mad-1_05-cv-11148-0.pdf
With these learnings as context, we connected AWPs for all generic drugs to CMS’ utilization data for Michigan Medicaid managed care to calculate the weighted average AWP per prescription and unit within the program. We were interested to learn if the findings in the prior section that lead us to believe that there is inherently upward pressure on AWPs would hold true with Michigan’s entire managed care generic drug mix. Figure 14 shows the results of this analysis. The weighted average AWP of Michigan’s managed care drug mix was $70.75 per prescription, or $1.34 per unit. By Q1 2018, Michigan’s managed care weighted average AWP had drifted up to $80.03 (+13%) and its weighted average AWP per unit had increased to $1.50 (+12%). As such, it does appear that the dynamics we identified in the prior section have impacted Michigan’s Medicaid managed care program.18

Figure 14 - Michigan Medicaid Managed Care Weighted Average AWP per Prescription and Unit (Generic Drugs)

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18 While CMS had published Q2 2018 state utilization data at the time of this study, the data appeared to be incomplete. The number of Michigan Medicaid managed care prescriptions reported in the Q2 2018 period (NDCs that were in the NADAC database) was 17% lower than the average of the prior four quarters. In our experience it is quite common for states to underreport utilization data for the most recent quarter to CMS, and then update the following quarter. To the extent that this analysis be replicated going forward, we recommend that it should be cut off at the penultimate quarter of data reported to CMS.
Our next task was to back into the overall GER that Michigan paid for drugs in each quarter. We calculated the actual GER by summing the total amount reimbursed for all generic drugs in Michigan Medicaid managed care and divided that by the total AWP for the same collection of generic drugs. We then subtracted the resulting fraction from 1 to arrive at the GER.

\[ \text{GER} = 1 - \frac{\sum \text{Total Amount Reimbursed}}{\sum \text{AWP}} \]

Figure 15 shows the result of this analysis for Michigan Medicaid managed care over the study period. As we have stated multiple times, we are not privy to the contract details between Michigan’s MCOs and their PBMs. But the uncanny stability of Michigan Medicaid managed care’s overall GER leads us to believe that this is the prevailing contract structure in the state.

Figure 15 - Michigan Medicaid Managed Care GER

We performed the same analysis in Figure 16 for Michigan’s fee-for-service program, which effective Q2 2017, transitioned to an acquisition cost plus professional dispensing fee model, as per CMS’ requirements in the Covered Outpatient Drugs Final Rule. Interestingly, before the transition, Michigan’s fee-for-service GER was almost identical to Michigan’s managed care GER. However, once

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the program was effectively disconnected from AWP, the GER started to increase, reflective of the ever-growing gap between AWP and NADAC (driven by all the factors identified in Section 5). The fee for service GER is going up simply because fee for service is designed to directly capture generic deflation. The more NADAC deflates relative to AWP, the more the state will save within fee for service.  

Figure 16 - Michigan Medicaid Fee for Service GER

8 FOCUSING ON ORAL SOLIDS

As we begin to add pharmacy reimbursement data to this analysis, we have chosen to transition analyzing oral solids only (e.g. tablets and capsules). While we believe there to be low risk in including non-oral solids in this analysis, due to limitations of CMS’ state utilization database, 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 analysis (CMS’ NADAC database, Wolters Kluwer’s MediSpan 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 Figure 17 shows, oral solids represent 84% of the prescriptions dispensed in Michigan Medicaid managed care and 65% of its total generic drug cost over the nine quarters included in this study.

20 Assuming constant GER guarantee between MCO and PBM
Figure 17 - Michigan Medicaid managed care Dosage Form Percent of Prescriptions and Total Cost

Figure 18 shows the change weighted average AWP per prescription and weighted average AWP per unit for oral solid generic drugs dispensed in Michigan Medicaid managed care. While the oral solid AWP per prescription is not meaningfully different from the weighted average AWP per prescription for all generics, the oral solid AWP per unit is considerably higher, reflecting the lower average units per prescription for an oral solid generic (40 units per prescription), compared to all other generics (127 units per prescription).  

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21 Overall average units reimbursed divided by number of prescriptions for all generic drugs dispensed in Michigan Medicaid managed care between Q1 2016 and Q1 2018 – derived from CMS’ State Drug Utilization Database
Figure 19 shows the oral solid generic GER calculation for both Michigan Medicaid managed care and fee-for-service. Again, we find the GER for managed care to be flat at ~87%. For oral solids generics only, fee-for-service has historically produced a lower GER but has reached parity with managed care after the state’s change to an acquisition cost-based model.

9  ORAL SOLID GENERIC COSTS IN MICHIGAN MEDICAID MANAGED CARE

With the state’s managed care AWP rising for oral solid generics and the GER remaining flat, it should come as no surprise that the weighted average cost per prescription/unit in managed care has increased over the study period (Figure 20).
We then compared the above state cost per prescription to the weighted average NADAC per prescription (Figure 21). We found that managed care’s weighted average cost per oral solid generic prescription rose 9% between Q1 2016 and Q1 2018. Conversely, the NADAC per prescription for the same group of drugs declined (22%) over the same period.

10 ASSESSING SPREAD PRICING IN MICHIGAN MEDICAID MANAGED CARE

At this point we have determined that there is a growing disconnect between what Michigan Medicaid managed care is paying for generic drugs, and that this disconnect is likely being driven by the underlying contract structure between Michigan’s MCOs and their PBMs. In other words, we have established that the generic “markup” (state cost less NADAC) has increased over time. What we have not yet established is where Michigan Medicaid managed care’s growing generic markup is going. The increasing gap could be margin retained by the PBM/MCO (i.e. “spread pricing”), or margin paid out the pharmacy. The goal of the remainder of this study is to provide better visibility into which party is benefitting from the increasing difference between state cost and acquisition cost.

10.1 MAXIMUM ALLOWABLE COST

Before we summarize our findings, we’ll take a brief diversion to discuss another pricing benchmark called Maximum Allowable Cost (or “MAC”). A brief discussion of MAC will hopefully provide context for how a concept like spread pricing comes to be.
Until recently, community pharmacies were primarily reimbursed for multi-source generic drugs based on MAC plus a nominal dispensing fee.\textsuperscript{22} Dispensing fees vary across PBM networks, but based on our experience, most dispensing fees are very small (i.e. less than $1 per claim). As such, the majority of a pharmacy’s reimbursement is driven by the MAC rate set by the PBM.

MAC rates are supposed to reflect the actual Maximum Allowable Cost at which the pharmacy should be acquiring a generic drug. But MAC rates are proprietary to the PBM, so there is no guarantee that this is the case and no mechanism holding PBMs accountable to the intent of the benchmark. In our experience, MAC lists vary widely not only from PBM to PBM but can vary within an individual PBM. There is nothing preventing a single PBM from maintaining multiple MAC lists – different lists for payers and providers; different list for different providers, different lists depending on the type of business (e.g. Part D, commercial and Medicaid).

Without any oversight on the rate-setting process to ensure that they are set to cover pharmacy cost, PBMs have aggressively ratcheted down MAC rates over the past two years, leading to an outcry from community pharmacy owners across the country. The downward pressure has been especially pronounced in Medicaid managed care programs. Our analysis of New York’s Medicaid managed care program found that pharmacy margins relative to NADAC compressed to just $0.53 per prescription in Q4 2017, nearly 95% below the state’s assessed cost to dispense\textsuperscript{23} for New York pharmacies.

\subsection*{10.2 Price 1 – Price 2 = Spread}

So, the mechanics of the process work as shown in Figure 22. Without a prevailing and transparent market price governing any given generic claim, two prices are set. Price 1 is the price charged to the payer (or MCO). This is some price that when lumped together with all other prices will deliver on the PBM’s committed discount to overall generic AWP. On the other side of the transaction is Price 2. This is the price paid out to the provider, which the PBMs have proven can be pushed down to acquisition cost or even below. Add up the difference between Price 1 and Price 2 across all generic drugs purchased by a payer/MCO, and that is spread. Last year, Ohio reported finding $225 million in spread in one year, $208 million of which came from generic drugs (31.4\% of gross generic cost).\textsuperscript{24} More recently, Kentucky reported finding 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.\textsuperscript{25}

\begin{itemize}
  \item \textsuperscript{22} PBMs in Michigan Medicaid managed care have begun to switch contracted pharmacies to a GER payment structure. We discuss this transition, and its implications on Michigan, in more detail in Section 13
  \item \textsuperscript{23} Includes all operating costs required to run a pharmacy (labor, rent, utilities, materials, etc.)
  \item \textsuperscript{24} https://ohioauditor.gov/news/pressreleases/Details/5042
  \item \textsuperscript{25} https://chfs.ky.gov/agencies/ohda/Documents1/CHFS_Medicaid_Pharmacy_Pricing.pdf
\end{itemize}
10.3 Adding Pharmacy Reimbursements to the Picture

With that as context, we connected pharmacy reimbursements to our integrated AWP / State Utilization / NADAC Database for all managed care plans. As mentioned in Section 15, we had access to claim level pharmacy reimbursements for 451 community pharmacies across Michigan – this is the largest pharmacy data set we have worked with to date. Overall, the aggregated results presented below are based on 1,824,103 Michigan Medicaid managed care claims dispensed for oral solid generic drugs between January 1, 2018 and March 31, 2018. Please see Section 15 for a full discussion on the methodology and process we used to create our comprehensive State Cost / NADAC / Pharmacy Reimbursement database.

The first analysis we performed was to compare the Michigan Medicaid managed care state cost per prescription that was presented in Figure 19 – before we stitched in pharmacy reimbursements – with the Michigan Medicaid managed care state cost per prescription after we stitched in pharmacy reimbursements. The two estimates of state cost per prescription are different because after stitching in pharmacy reimbursement culls the database down to only those NDCs that pharmacies within our
sample dispensed each quarter. The NDCs that the state reported dispensing that were not dispensed by sampled pharmacy drop out of the quarter’s data.

While working with an incomplete set of data introduces error into any data analytics project, the good news is that this error appears to be minimal in this analysis. As shown in Figure 23, the mix of generic oral solids dispensed by pharmacies in our study appears to be slightly less expensive than Michigan Medicaid managed care’s overall mix, but only by an average of 4% each quarter. Most importantly, the two data sets trend together very closely.

Figure 23 - Comparison of Michigan Managed Care Cost per Prescription Before and After Pharmacy Data (Oral Solid Generics)

<table>
<thead>
<tr>
<th>Michigan Medicaid Managed Care Weighted Average Cost per Prescription - Oral Solid Generics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managed Care Cost per Prescription - Only NDCs for which we have Pharmacy Data</td>
</tr>
<tr>
<td>Managed Care Cost per Prescription - All NDCs</td>
</tr>
</tbody>
</table>

10.4 QUARTERLY SPREAD PRICING ANALYSIS – GENERIC ORAL SOLID DRUGS

After this validation step, we moved on to a comparison of per prescription managed care cost, pharmacy reimbursement, and NADAC over the nine-quarter study period. Figure 24 shows the results of this analysis. The overall change in cost per prescription – from the start of the study period (Q1 2016) to the end of the study period (Q1 2018) – for each of the three cost benchmarks was:

- Managed Care Cost per Prescription went up 7% from $9.33 to $9.98
- NADAC per Prescription went down (22%) from $7.77 to $6.09
- Pharmacy Revenue per Prescription went down (28%) from $9.13 to $6.58
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 both components of the supply chain (PBM/MCO and pharmacy). *Figure 25* shows the net effect of combining the static AWP-linked drug payments on the payer side, with floating proprietary MAC rates on the pharmacy side. Pharmacy margin, which on generic oral solid drugs was already significantly below Michigan’s $10.64 per prescription cost to dispense\(^{26}\), was cut (64%) from $1.36 to $0.49 per prescription. Meanwhile PBM/MCO spread pricing margin increased by 17 times from $0.20 (2% of total) to $3.40 (34% of total) per prescription.

It is worth reiterating that over the entire study period pharmacy margin on oral solid generics in managed care considerably lagged the $10.64 per prescription cost to dispense set based on the Dispensing Cost Survey and Analysis published by Myers and Stauffer on February 21, 2017. The breakdown by type of expense calculated by Myers and Stauffer is presented in Table 4. This surveyed cost to dispense was implemented by Michigan Medicaid fee-for-service to comply with pharmacy reimbursement requirements set forth in the Center for Medicare and Medicaid Services’ (CMS) Covered Outpatient Drug Final Rule (CMS-2390-F).

Table 4 - Myers and Stauffer Michigan Pharmacy Cost to Dispense Breakdown (per Prescription)

<table>
<thead>
<tr>
<th>Type of Expense</th>
<th>Mean Weighted by Medicaid Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner Professional Labor</td>
<td>$0.586</td>
</tr>
<tr>
<td>Employee Professional and Other Labor</td>
<td>$6.586</td>
</tr>
<tr>
<td>Building and Equipment</td>
<td>$1.019</td>
</tr>
<tr>
<td>Prescription Specific Expenses (including delivery)</td>
<td>$0.846</td>
</tr>
<tr>
<td>Other Overhead Expenses</td>
<td>$1.598</td>
</tr>
<tr>
<td>Total</td>
<td>$10.635</td>
</tr>
</tbody>
</table>

However, states are not held accountable to this requirement if the pharmacy benefit is “carved in” to managed care. As shown in Figure 26, we found that managed care paid only 13% of the cost to dispense.

dispense to pharmacy for oral solid generic drugs in Q1 2016. By Q1 2018, managed care only paid 5% of the cost to dispense for these drugs.

Figure 26 - Michigan Medicaid Managed Care Pharmacy Margin over NADAC and Cost to Dispense - Oral Solid Generics

Another way of visualizing spread is on a GER basis. In Figure 27, we have performed GER calculations based on pharmacy reimbursements (e.g. 1 – total pharmacy reimbursement / total AWP) and NADAC and plotted those series against Michigan Medicaid managed care’s GER for oral solid generics. Back in Q1 2016, the GER gap between managed care and NADAC was 2.3 points (88.8% - 86.5%) and the GER spread between managed care and pharmacy was only 0.4 points (86.9% - 86.5%). In Q1 2018, managed care’s GER was only up 0.5 points to 87.0%, materially lagging a 3.5-point increase to the NADAC GER and a 4.7-point increase to the pharmacy GER. By Q1 2018, the GER spread between managed care and pharmacy for oral solid generic drugs had gapped open to 4.6 points (91.6% vs. 87.0%).

10.5 GER COMPARISON – MANAGED CARE, PHARMACY, NADAC

Another way of visualizing spread is on a GER basis. In Figure 27, we have performed GER calculations based on pharmacy reimbursements (e.g. 1 – total pharmacy reimbursement / total AWP) and NADAC and plotted those series against Michigan Medicaid managed care’s GER for oral solid generics. Back in Q1 2016, the GER gap between managed care and NADAC was 2.3 points (88.8% - 86.5%) and the GER spread between managed care and pharmacy was only 0.4 points (86.9% - 86.5%). In Q1 2018, managed care’s GER was only up 0.5 points to 87.0%, materially lagging a 3.5-point increase to the NADAC GER and a 4.7-point increase to the pharmacy GER. By Q1 2018, the GER spread between managed care and pharmacy for oral solid generic drugs had gapped open to 4.6 points (91.6% vs. 87.0%).
10.6 ANNUAL SPREAD PRICING ANALYSIS – GENERIC ORAL SOLID DRUGS

On an annual basis (Figure 28), in 2016, we calculate that the Michigan Medicaid managed care program paid a weighted average of $9.26 per oral solid generic prescriptions. The weighted average NADAC ingredient cost of the same basket of prescriptions was $7.29 per prescription in 2016, or 78% of the total state cost. In 2016, $1.41 per prescription, or 15% of the overall state cost went to the pharmacy, while $0.56 per prescription, or 6% of the overall state cost, was retained by the PBM.
In 2017, the managed care cost of oral solid generics increased to $9.54 per prescription, despite a decrease in NADAC ingredient cost to $6.10 (64% of total state cost) per prescription. As such, the “markup” (i.e. difference between state cost and NADAC) increased to $3.44 per prescription – $2.74 (29% of total state cost) of which was retained by the PBM, and only $0.70 (7% of total state cost) which was passed back to pharmacy. Figure 29 shows the year-over-year percentage changes in managed care cost, NADAC ingredient cost, pharmacy margin, markup and spread pricing margin from 2016 to 2017.

**Figure 29 - YoY Percent Change in Revenue/Cost for Oral Solid Generics in Michigan Medicaid Managed Care (2016 vs. 2017)**
10.7 **Top 10 Michigan Medicaid Managed Care Spread Drugs in Q1 2018**

To help visualize spread on a more granular level, *Table 5* presents the top 10 “spread pricing” oral solid generic drugs in Q1 2018 within Michigan Medicaid managed care. The table shows the cost per prescription reported by the state in comparison to the revenue per prescription reported by the pharmacy and NADAC ingredient cost. The list includes only those oral solid generic drugs for which we had 25 or more Michigan Medicaid managed care pharmacy claims in Q1 2018.

*Table 5 - Q1 2018 Top 10 Spread Pricing Oral Solid Generic Drugs (per Prescription)*

<table>
<thead>
<tr>
<th>NDC Description</th>
<th>Managed Care Cost</th>
<th>Pharmacy Revenue</th>
<th>NADAC</th>
<th>Spread</th>
</tr>
</thead>
<tbody>
<tr>
<td>SEVELAMER CARBONATE 800 MG TAB</td>
<td>$826.69</td>
<td>$423.07</td>
<td>$463.57</td>
<td>$403.62</td>
</tr>
<tr>
<td>TACROLIMUS 1 MG CAPSULE</td>
<td>$115.91</td>
<td>$22.78</td>
<td>$37.81</td>
<td>$93.12</td>
</tr>
<tr>
<td>ACETAZOLAMIDE ER 500 MG CAP</td>
<td>$134.18</td>
<td>$73.97</td>
<td>$88.44</td>
<td>$60.21</td>
</tr>
<tr>
<td>URSODIOL 300 MG CAPSULE</td>
<td>$235.53</td>
<td>$189.50</td>
<td>$189.97</td>
<td>$46.03</td>
</tr>
<tr>
<td>LEFLUNOMIDE 20 MG TABLET</td>
<td>$120.77</td>
<td>$77.83</td>
<td>$73.17</td>
<td>$42.94</td>
</tr>
<tr>
<td>TOLTERODINE TART ER 4 MG CAP</td>
<td>$112.64</td>
<td>$76.57</td>
<td>$69.07</td>
<td>$36.07</td>
</tr>
<tr>
<td>MORPHINE SULF ER 100 MG TABLET</td>
<td>$136.18</td>
<td>$100.77</td>
<td>$85.89</td>
<td>$35.42</td>
</tr>
<tr>
<td>ACETAZOLAMIDE 250 MG TABLET</td>
<td>$131.07</td>
<td>$96.08</td>
<td>$119.06</td>
<td>$34.99</td>
</tr>
<tr>
<td>HYDROXYCHLOROQUINE 200 MG TAB</td>
<td>$64.07</td>
<td>$30.72</td>
<td>$20.82</td>
<td>$33.36</td>
</tr>
<tr>
<td>MORPHINE SULF ER 60 MG TABLET</td>
<td>$81.57</td>
<td>$48.62</td>
<td>$46.14</td>
<td>$32.95</td>
</tr>
</tbody>
</table>

Trend charts for the top 10 Q1 2018 spread drugs have been provided in *Figure 30*.

*Figure 30 - Q1 2018 Top 10 Spread Pricing Oral Solid Generic Drugs (Trend Charts)*

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28 To ensure apples-to-apples comparison when comparing per prescription amounts, we calculated the per unit prices for managed care, pharmacy, and NADAC and multiplied all by the units per prescription reported by the state to CMS.
11 MCO PHARMACY MARGIN COMPARISON

Publicly available CMS State Utilization Data, from which we derive per unit managed care costs, are unfortunately only available for managed care at an aggregated level. As such, our spread analysis was limited to overall managed care. However, we can drill down to the MCO when analyzing pharmacy revenue and margin. This helps provide a better understanding of which plans are utilizing the most aggressive MAC lists to reimburse network pharmacies.

Figure 31 shows the pharmacy margin (relative to NADAC ingredient costs) by MCO and year. The plans are sorted left to right in descending order of 2018 pharmacy margin. As expected, our results showed the highest margin in fee-for-service due to its reliance on an acquisition cost plus professional dispensing fee model. While all plans failed to reimburse pharmacy in line with fee-for-service, four plans appear to have paid pharmacy based on MAC lists that were aggressive enough to push pharmacy margin below $1 per prescription, or even negative. These four plans were Blue Cross Complete (managed by PerformRx), United Healthcare (managed by OptumRx), Molina (managed by CVS/Caremark), and Aetna Better Health (also managed by CVS/Caremark).
Overall, the above analysis contains 7.1 million oral solid generic drug pharmacy claims dispensed by Michigan pharmacies between January 1, 2016 and October 31, 2018. As shown in Table 6, this was divided into 2.6 million fee-for-service claims and 4.5 million managed care claims. Of the 4.5 million managed care claims, Meridian was the largest with 1.5 million claims. The four lowest margin plans represented 2.7 million claims, or 61% of all managed care claims.

<table>
<thead>
<tr>
<th>Plan Name</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aetna Better Health</td>
<td>65,303</td>
<td>83,255</td>
<td>73,002</td>
<td>221,560</td>
</tr>
<tr>
<td>Blue Cross Complete</td>
<td>187,332</td>
<td>254,573</td>
<td>241,097</td>
<td>683,002</td>
</tr>
<tr>
<td>Fee for Service</td>
<td>849,816</td>
<td>980,953</td>
<td>814,631</td>
<td>2,645,400</td>
</tr>
<tr>
<td>Harbor Health Plan</td>
<td>2,200</td>
<td>8,906</td>
<td>11,106</td>
<td></td>
</tr>
<tr>
<td>McLaren Health Plan</td>
<td>14,509</td>
<td>152,546</td>
<td>167,055</td>
<td></td>
</tr>
<tr>
<td>Meridian</td>
<td>466,103</td>
<td>526,808</td>
<td>462,345</td>
<td>1,455,256</td>
</tr>
<tr>
<td>Molina</td>
<td>188,165</td>
<td>236,868</td>
<td>197,124</td>
<td>622,157</td>
</tr>
<tr>
<td>Total Health Care</td>
<td>8,119</td>
<td>9,385</td>
<td>10,749</td>
<td>28,253</td>
</tr>
<tr>
<td>United Healthcare</td>
<td>403,725</td>
<td>448,217</td>
<td>369,083</td>
<td>1,221,025</td>
</tr>
<tr>
<td>Upper Peninsula Health Plan</td>
<td>24,069</td>
<td>37,985</td>
<td>5,193</td>
<td>67,247</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>2,192,632</strong></td>
<td><strong>2,594,753</strong></td>
<td><strong>2,334,676</strong></td>
<td><strong>7,122,061</strong></td>
</tr>
<tr>
<td>Managed Care</td>
<td>1,342,816</td>
<td>1,613,800</td>
<td>1,520,045</td>
<td>4,476,661</td>
</tr>
<tr>
<td>% Medicaid</td>
<td>61.2%</td>
<td>62.2%</td>
<td>65.1%</td>
<td>62.9%</td>
</tr>
<tr>
<td>Bottom Four Pharmacy Margin Plans</td>
<td>844,525</td>
<td>1,022,913</td>
<td>880,306</td>
<td>2,747,744</td>
</tr>
<tr>
<td>% Managed Care</td>
<td>62.9%</td>
<td>63.4%</td>
<td>57.9%</td>
<td>61.4%</td>
</tr>
</tbody>
</table>
As discussed in Section 9.1, MAC rates are proprietary to the PBM. The fact that there is such a large disparity between pharmacy margin across plans suggest that MAC rate lists must vary considerably across plans. To test this, we looked at the pharmacy revenue per unit by MCO for the top 10 generic oral solids dispensed by pharmacies included in our sample in January 2018. We chose just one month to attempt to get as close of a representation of what the PBM’s MAC rate was for each drug at a single point in time. *Table 7* shows the results of this analysis. All 10 drugs show considerable variance in revenue per unit across plans. Aetna, Molina, United, and Blue Cross Complete are consistently the lowest payers across the 10 top drugs.

*Table 7 - Pharmacy Revenue per Unit by MCO (Top 10 Oral Solid Generic Drugs)*

<table>
<thead>
<tr>
<th>Plan Name</th>
<th>AMLODIPINE BESYLATE 10 MG TAB</th>
<th>CETIRIZINE HCL 10 MG TABLET</th>
<th>CYCLOBENZAPRINE 10 MG TABLET</th>
<th>HYDROCODONE-ACETAMINOPHEN 7.5-325 MG TABLET</th>
<th>HYDROCODONE-ACETAMINOPHEN 10-325 MG TABLET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aetna Better Health</td>
<td>$0.02</td>
<td>$0.05</td>
<td>$0.02</td>
<td>$0.12</td>
<td>$0.15</td>
</tr>
<tr>
<td>Blue Cross Complete</td>
<td>$0.05</td>
<td>$0.08</td>
<td>$0.04</td>
<td>$0.15</td>
<td>$0.20</td>
</tr>
<tr>
<td>Harbor Health Plan</td>
<td>$0.08</td>
<td>$0.26</td>
<td>$0.06</td>
<td>$0.21</td>
<td>$0.20</td>
</tr>
<tr>
<td>McLaren Health Plan</td>
<td>$0.14</td>
<td>$0.19</td>
<td>$0.11</td>
<td>$0.26</td>
<td>$0.21</td>
</tr>
<tr>
<td>Meridian</td>
<td>$0.09</td>
<td>$0.43</td>
<td>$0.05</td>
<td>$0.17</td>
<td>$0.19</td>
</tr>
<tr>
<td>Molina</td>
<td>$0.02</td>
<td>$0.05</td>
<td>$0.02</td>
<td>$0.12</td>
<td>$0.15</td>
</tr>
<tr>
<td>Total Health Care</td>
<td>$0.07</td>
<td>$0.45</td>
<td>$0.05</td>
<td>$0.27</td>
<td>$0.21</td>
</tr>
<tr>
<td>United Healthcare</td>
<td>$0.03</td>
<td>$0.04</td>
<td>$0.02</td>
<td>$0.11</td>
<td>$0.12</td>
</tr>
<tr>
<td>Upper Peninsula Health Plan</td>
<td>$0.15</td>
<td>$0.19</td>
<td>$0.11</td>
<td>$0.28</td>
<td>$0.21</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Plan Name</th>
<th>IBUPROFEN 800 MG TABLET</th>
<th>LORATADINE 10 MG TABLET</th>
<th>NAPROXEN 500 MG TABLET</th>
<th>OMEPRAZOLE DR 20 MG CAPSULE</th>
<th>RANITIDINE 150 MG TABLET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aetna Better Health</td>
<td>$0.03</td>
<td>$0.05</td>
<td>$0.05</td>
<td>$0.04</td>
<td>$0.03</td>
</tr>
<tr>
<td>Blue Cross Complete</td>
<td>$0.07</td>
<td>$0.07</td>
<td>$0.06</td>
<td>$0.06</td>
<td>$0.07</td>
</tr>
<tr>
<td>Harbor Health Plan</td>
<td>$0.08</td>
<td>$0.14</td>
<td>$0.10</td>
<td>$0.08</td>
<td>$0.08</td>
</tr>
<tr>
<td>McLaren Health Plan</td>
<td>$0.13</td>
<td>$0.20</td>
<td>$0.15</td>
<td>$0.16</td>
<td>$0.12</td>
</tr>
<tr>
<td>Meridian</td>
<td>$0.08</td>
<td>$0.12</td>
<td>$0.09</td>
<td>$0.08</td>
<td>$0.08</td>
</tr>
<tr>
<td>Molina</td>
<td>$0.03</td>
<td>$0.05</td>
<td>$0.05</td>
<td>$0.04</td>
<td>$0.03</td>
</tr>
<tr>
<td>Total Health Care</td>
<td>$0.08</td>
<td>$0.14</td>
<td>$0.09</td>
<td>$0.13</td>
<td>$0.10</td>
</tr>
<tr>
<td>United Healthcare</td>
<td>$0.04</td>
<td>$0.05</td>
<td>$0.05</td>
<td>$0.05</td>
<td>$0.04</td>
</tr>
<tr>
<td>Upper Peninsula Health Plan</td>
<td>$0.14</td>
<td>$0.19</td>
<td>$0.16</td>
<td>$0.16</td>
<td>$0.13</td>
</tr>
</tbody>
</table>

**12 PHARMACY “UNDERWATER CLAIMS” BY MCO**

Another manner of comparing plan pharmacy reimbursements 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.” *Figure 32* presents this analysis by month for all Michigan Medicaid managed care plans. Overall, most managed care plans appear to be keeping underwater claims to a minimum, with a few notable exceptions.

- Meridian’s underwater claims were in the high teens in early 2016 but have come down over the study period
- Blue Cross Complete’s underwater claims have remained between ~15-25% throughout the study period
- United’s underwater claims spiked to over 50% in early-2017 and approached 70% by early-2018 before falling to the low teens in October 2018
• Molina and Aetna’s underwater claims spiked in July 2016, before settling back below 10%. Underwater claims spiked again in August/September 2017 and rose to nearly 70% before falling back under 40%. Underwater claims rose yet again through the summer of 2018 before dropping precipitously in October 2018. The timing of the rate pressure exhibited in this chart coincides with pressure in other CVS/Caremark-run managed care programs we have studied in other states.
  o The trend lines for Molina and Aetna are nearly identical, suggesting that CVS/Caremark may be utilizing the same pharmacy MAC list for these two plans

*Figure 32 - Underwater Claims (Pharmacy Revenue < NADAC) as a Percentage of Overall Claims by MCO*

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13 PBMS IMPLEMENT GER IN PHARMACY CONTRACTS

As noted in the prior section, the rate pressure applied to pharmacy by both OptumRx and CVS/Caremark abruptly subsided towards the end of the study period. We researched this further and found out that both PBMs moved Michigan Medicaid network pharmacies to a GER contract structure towards the end of 2018. GER contracts between PBMs and pharmacies function the same as a GER contract between PBMs and payers. The PBM pays the pharmacy based on a MAC list but makes a commitment to pay no more (or less) than a contracted aggregate discount to AWP.

There is nothing inherently wrong with this arrangement if the PBM’s MAC lists are managed carefully and fairly to arrive at the negotiated discount to AWP. But *Figure 33* raises some concerns on whether...
OptumRx is managing its MAC list to avoid a “true up.” As shown below, weighted average pharmacy reimbursement by United Healthcare for Michigan’s top 10 oral solid generic drugs by volume (studied earlier) more than doubled from July 2018 to October 2018, despite an immaterial change to the underlying cost of these drugs. This raises concern that the PBM may be reimbursing the pharmacy at the point-of-sale based on a higher MAC list, and then “truing-up” pharmacies weeks or months later to the negotiated GER. This would have the effect of moving PBM spread from the point-of-sale to a retroactive GER true-up that the state would have no ability to monitor and would also further cloud data regarding prescription drug transactions. To the extent that pharmacy GER contracts become the norm in Medicaid managed care, we worry that this will completely hide PBM spread margin from Medicaid’s view, and overinflate drug prices that are being used to set managed care capitation rates.

![Figure 33 - Pharmacy Revenue and NADAC per Unit, Top 10 Generic Oral Solids (United Healthcare)](image)

We took a deeper look into the changes in pharmacy reimbursement from July 2018 to October 2018 for both United Healthcare (OptumRx) and Molina/Aetna (CVS/Caremark). We looked at all generic drugs dispensed by pharmacies in our database in both months through each PBM, calculated the per unit reimbursement in each month, and studied the changes in reimbursements. Table 8 shows the results of this analysis. We found that OptumRx and CVS/Caremark increased pharmacy revenue per unit on 91% and 79% of all generic drugs, respectively. The average percent change across all generic drugs was +105% at OptumRx and +125% at CVS/Caremark.

<table>
<thead>
<tr>
<th>Table 8 - OptumRx and CVS/Caremark Rate Changes, July 2018 to October 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total generic drugs in sample</td>
</tr>
<tr>
<td>--------------------------------</td>
</tr>
<tr>
<td>Number of drugs that experienced a per unit increase in pharmacy revenue between July 2018 to October 2018</td>
</tr>
<tr>
<td>(91% of total)</td>
</tr>
<tr>
<td>Average % change in per unit drug reimbursement</td>
</tr>
</tbody>
</table>
To be clear, we are not asserting that pharmacy GER contracts are being manipulated to hide spread pricing from the state. We are simply pointing out that without proper accounting and oversight by the state, this contract structure can be used by PBMs to further obfuscate spread pricing.

14 ANALYSIS OF MICHIGAN’S BEHAVIORAL HEALTH CARVE OUT

The last analysis we performed was an assessment of the cost impact of Michigan’s behavioral health carve out. Michigan is one a handful of states that have chosen to “carve out” financing and management of its behavioral health medications from managed care to fee-for-service. As we have reviewed, managed care and fee-for-service have different mechanisms by which they assign cost to a generic drug. Most managed care applies a proprietary MAC list and manages this list to deliver a contracted discount to AWP. As of April 1, 2017, fee-for-service applies an actual acquisition cost and adds a professional dispensing fee. Michigan’s carve out of behavioral health medications shifted a large contingent of drugs to this acquisition cost-based model. We set out to estimate the financial impact of this decision.

To perform this analysis, we constructed a new database that first combined all CMS state utilization data with CMS’ NADAC database. We then flagged all current NDCs dispensed by Medicaid that were part of the MediSpan “Central Nervous System Agents” category. Adding this flag to the database allowed us to calculate aggregate spending for drugs in this category for all U.S. Medicaid managed care programs and compare the resulting unit costs to what Michigan reported in fee-for-service.

Between Q2 2017 and Q1 2018 we estimate that Michigan spent $93.3 million on behavioral health generic drugs in fee-for-service. We then modeled what Michigan’s spend would have been had Michigan been paying the weighted average unit cost paid by U.S. Medicaid managed care programs and compare the resulting unit costs to what Michigan reported in fee-for-service.

Between Q2 2017 and Q1 2018 we estimate that Michigan spent $93.3 million on behavioral health generic drugs in fee-for-service. We then modeled what Michigan’s spend would have been had Michigan been paying the weighted average unit cost paid by U.S. Medicaid managed care programs and compare the resulting unit costs to what Michigan reported in fee-for-service.

As shown in Figure 34, had these drugs been dispensed in the average managed care program, they would have cost Michigan $113.7 million, or $20.4 million more than Michigan paid in fee-for-service.

29 We confirmed that all drug groups and classes within this category were part of Michigan’s carve out using the list found here - https://michigan.fhsc.com/Downloads/MI_MedicaidHealthPlanCarveout.pdf
30 Michigan’s acquisition cost plus professional dispensing fee model in fee for service was implemented on April 1, 2017. As such, Q2 2017 through Q1 2018 is the first 12-month period we can assess where fee for service drugs costs are fully linked to actual acquisition cost.
31 We included managed care programs from all states except Kansas and Mississippi when deriving nationwide weighted average managed care unit costs for behavioral health drugs. These two states were excluded because both require a fee for service reimbursement model within their managed care programs. As such, when it comes to drug costs, they behave more like fee for service programs than managed care programs.
Interestingly, MI fee-for-service was not uniformly less expensive than national-average managed care for these drugs. In fact, 64% of all drugs carried a cheaper unit cost in managed care than in Michigan fee-for-service. However, as shown in Table 9, it turns out that uncompetitive pricing on just four behavioral health drugs would have cost the state nearly $31 million more had these drugs been priced by a typical managed care PBM.

Table 9 - Top 4 Generic Drugs Driving Michigan’s Carve Out Savings

<table>
<thead>
<tr>
<th>Dollars in Millions</th>
<th>MI Actual FFS</th>
<th>MI modeled MCO</th>
<th>MI Savings FFS</th>
<th>MI Savings FFS %</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARIPIRAZOLE</td>
<td>$7.57</td>
<td>$25.16</td>
<td>$17.59</td>
<td>70%</td>
</tr>
<tr>
<td>QUETIAPINE ER</td>
<td>$8.98</td>
<td>$14.67</td>
<td>$5.69</td>
<td>39%</td>
</tr>
<tr>
<td>DULOXETINE HCL DR</td>
<td>$5.10</td>
<td>$10.10</td>
<td>$5.00</td>
<td>50%</td>
</tr>
<tr>
<td>PALIPERIDONE ER</td>
<td>$9.98</td>
<td>$12.38</td>
<td>$2.41</td>
<td>19%</td>
</tr>
<tr>
<td><strong>Top 4</strong></td>
<td><strong>$31.63</strong></td>
<td><strong>$62.31</strong></td>
<td><strong>$30.68</strong></td>
<td><strong>49%</strong></td>
</tr>
<tr>
<td>All Other</td>
<td>$61.64</td>
<td>$51.38</td>
<td>($10.26)</td>
<td>(20%)</td>
</tr>
<tr>
<td>All Behavioral Health</td>
<td>$93.27</td>
<td>$113.70</td>
<td><strong>$20.42</strong></td>
<td><strong>18%</strong></td>
</tr>
</tbody>
</table>

What is so special about these four drugs? They declined in price – by a lot. If a payer is in a model where drug costs are linked to static AWPs, the faster actual generic drug prices deflate, the more the payer will overpay. Between Q1 2016 and Q1 2018, these four drugs experienced a 77% decrease in
weighted average NADAC, but only a 5% decline in weighted average AWP.\textsuperscript{32} \textit{Table 10} shows the NADAC history for each of these four behavioral health generic drugs.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|}
\hline
 & Aripiprazole & Quetiapine ER & Duloxetine DR & Paliperidone ER \\
\hline
2016-Q1 & $7.50 & & & \\
2016-Q2 & $5.20 & $0.48 & $21.98 & \\
2016-Q3 & $3.64 & $0.39 & $20.75 & \\
2016-Q4 & $2.28 & $19.92 & $0.36 & $19.49 \\
2017-Q1 & $1.72 & $13.75 & $0.31 & $16.52 \\
2017-Q2 & $1.03 & $9.34 & $0.28 & $15.17 \\
2017-Q3 & $0.82 & $2.09 & $0.26 & $14.47 \\
2017-Q4 & $0.69 & $1.05 & $0.27 & $13.71 \\
2018-Q1 & $0.52 & $0.89 & $0.23 & $13.56 \\
\hline
\end{tabular}
\caption{NADAC Pricing History of Top 4 Behavioral Health Drugs}
\end{table}

Due to their rapid price deflation and high utilization, these are prototypical PBM spread drugs. By carving out this class of drugs out from managed care, Michigan was able directly capture these cost savings.

\section*{15 DATABASE CREATION — SOURCES, METHODOLOGY, AND VALIDATION}

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

1) CMS’ State Drug Utilization Database (SDUD)
2) CMS’ National Average Drug Acquisition Cost (NADAC) database
3) Michigan Pharmacy Reimbursement Data

Detail on these sources of drug pricing data are provided below:

\subsection*{15.1 STATE DRUG UTILIZATION DATABASE}

States are required to report drug utilization for covered outpatient drugs paid for by state Medicaid agencies. Utilization is reported on a quarterly basis by states and published on Medicaid.gov approximately four months after the close of each quarter. The database includes total dollars spent, units reimbursed, and prescriptions for each 11-digit NDC per quarter for each state and program type (i.e. managed care or fee-for-service). This database is the source of all per unit and prescription state costs calculated in this report.

\textsuperscript{32} Based on MI Medicaid utilization. Q1 2016 weighted average NADAC per unit = $3.90. Q1 2018 weighted average NADAC per unit = $0.89. Q1 2016 weighted average AWP per unit = $18.64. Q1 2018 weighted average NADAC per unit = $17.64.
15.2 NATIONAL AVERAGE DRUG ACQUISITION COST (NADAC) DATABASE

NADAC was developed by the Centers for Medicare and Medicaid Services (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.” As such, NADAC’s goal is to be the most comprehensive public measurement of market-based retail pharmacy acquisition cost.

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 450-600 respondents). After Myers & Stauffer completes its data processing and clean-up activities, it publishes the survey results at the National Drug Code (NDC) level on Medicaid.gov. As of December 2018, the NADAC database included prices for 24,975 different NDCs. As state Medicaid fee for service programs have shifted to an actual acquisition cost basis to comply with the Covered Outpatient Drug Rule (CMS-2345-FC) many states have utilized NADAC as a proxy for acquisition cost. As such, we believe NADAC is the best publicly-available pricing benchmark to approximate average pharmacy invoice costs.

We relied on the NADAC database extensively throughout this report as the best estimate for a drug’s actual acquisition cost.

15.3 MICHIGAN PHARMACY REIMBURSEMENT INFORMATION

With assistance from SRS Pharmacy Systems, 3 Axis Advisors obtained deidentified and delocalized claims data from 451 pharmacies across Michigan with fill dates between January 1, 2016 and October 31, 2018. The only claim-level data fields utilized in this study were:

- Date prescription was filled
- National Drug Code (NDC) of drug dispensed
- Quantity dispensed
- Total reimbursement (all payers)
- Primary payer BIN, PCN, and Group

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

15.4 MediSpan PriceRx by Wolters Kluwer Clinical Drug Information, Inc.

MediSpan 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. PriceRx was the source of the raw AWP data that we used to calculate aggregated quarterly AWPs for our analysis in Section 5.

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34 See Section 15.5 for a discussion on NADAC’s limitations
15.5 CONSTRUCTION OF THE SPREAD PRICING DATABASE

This section details how we constructed the primary database that we used to assess spread pricing in Michigan Medicaid managed care.

The first step was to join pharmacy reimbursement data together with NADAC. We used Tableau Prep to stitch together our pharmacy claims database with CMS’ NADAC database, constructing the “flow” as illustrated in the top section of Figure 35. The bottom portion of Figure 35 explains the purpose of each element within the database creation process.

This process resulted in a database containing 32,829,645 prescriptions dispensed by Michigan pharmacies between January 1, 2016 and October 31, 2018 with a corresponding NADAC. Of these claims, 28,862,487 or 87.9% were for generic drug prescriptions while 3,967,158 or 12.1% were for brand-name drug prescriptions. The combined monthly claims over this period for the pharmacies in our sample averaged 965,578.

The next step in the process was to identify claims dispensed within Michigan Medicaid over this period. To do this, 3 Axis Advisors worked with pharmacies across the state to specify plan definitions for all Michigan Medicaid plans (see Table 11).
Overall, the database includes 9.8 million Medicaid claims dispensed over 34 months – 3.4 million fee-for-service and 6.4 million managed care. The database included 7.1 million oral solid generic drugs, 4.5 million of which were dispensed in managed care (Table 12).

### Table 12 - Pharmacy Claim Counts by MCO - Brand vs. Generic

<table>
<thead>
<tr>
<th>Plan Name</th>
<th>Brand</th>
<th>Generic</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Oral Solids</td>
<td>Other</td>
<td>Oral Solids</td>
</tr>
<tr>
<td>Aetna Better Health</td>
<td>4,272</td>
<td>31,996</td>
<td>221,560</td>
</tr>
<tr>
<td>Blue Cross Complete</td>
<td>14,750</td>
<td>89,714</td>
<td>683,002</td>
</tr>
<tr>
<td>Fee for Service</td>
<td>333,636</td>
<td>97,026</td>
<td>2,645,400</td>
</tr>
<tr>
<td>Harbor Health Plan</td>
<td>41</td>
<td>1,287</td>
<td>11,106</td>
</tr>
<tr>
<td>McLaren Health Plan</td>
<td>2,520</td>
<td>19,309</td>
<td>167,055</td>
</tr>
<tr>
<td>Meridian</td>
<td>19,976</td>
<td>176,674</td>
<td>1,455,256</td>
</tr>
<tr>
<td>Molina</td>
<td>7,299</td>
<td>84,911</td>
<td>622,157</td>
</tr>
<tr>
<td>Total Health Care</td>
<td>182</td>
<td>3,748</td>
<td>28,253</td>
</tr>
<tr>
<td>United Healthcare</td>
<td>22,391</td>
<td>151,755</td>
<td>1,221,025</td>
</tr>
<tr>
<td>Upper Peninsula Health Plan</td>
<td>1,465</td>
<td>8,263</td>
<td>67,247</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>406,532</strong></td>
<td><strong>664,683</strong></td>
<td><strong>7,122,061</strong></td>
</tr>
</tbody>
</table>

The final step of the database creation process was to connect the payments reported to CMS by Michigan from CMS’ State Drug Utilization Database.

We again used Tableau Prep to stitch together the combined pharmacy claims / NADAC database with Michigan’s SDUD, constructing the “flow” as illustrated in the top section of Figure 36. The bottom portion of Figure 36 explains the purpose of each element within the database creation process.

As mentioned earlier, our assessment of Q2 2018 data was that it was not sufficiently complete to include in the study period. As such, we chose to limit the study to the nine-quarters spanning Q1 2016 through Q1 2018.
This last step in the database creation process reduced our final sample down to 1,824,103 managed care claims for oral solid generic drugs dispensed between Q1 2016 and Q1 2018. Altogether, the final database includes state payments, pharmacy reimbursements, and NADAC benchmark pricing for 9,448 generic oral solid NDCs and 1,700 unique generic oral solid drugs.

15.6 HOW THE DATA WAS AGGREGATED

All three weighted average price points – state payments, pharmacy reimbursements, and NADAC – were calculated using the same drug mix to ensure an apples-to-apples comparison across the three series. We used a drug mix based on Michigan’s NDC-level managed care state utilization data to weight each of the three benchmark costs. In other words, we multiplied NDC-level unit volumes from New York’s state utilization data by each of the three per-unit costs, added up the costs, and divided by the total units in the state utilization data for all NDCs present in our combined database. For an illustration of this calculation, see the left table within Figure 37.

We chose to use the state’s drug mix instead of the collective pharmacy mix to remove distortions that could be caused by differences in any individual pharmacy’s drug mix relative to the state’s overall managed care mix. We’ll return to the example in Figure 37 to better illustrate the impact that mix can have on this analysis. In our hypothetical example, we have three drugs – NDC 1, NDC 2, and NDC 3. We can see that on an absolute basis, NDC 2 has the most spread ($0.20 per unit) but it is only 8% of the state’s overall utilization. On the other hand, NDC 3 only has a $0.02 spread, but is 60% of the state’s utilization. Given the disproportionally large utilization of NDC 3, it will have an outsized impact on the state’s weighted average cost ($0.38 per unit), and the resulting spread ($0.07 per unit).
Now let’s assume that the pharmacies in this study collectively serve a patient base that is heavily weighted towards individuals that are being treated with NDC 2. As such, the pharmacy’s mix, as shown in the right table in Figure 37, may look very different than the state’s mix. In our hypothetical example, we’ve flipped the weightings on NDC 2 and NDC 3 – NDC 2 now is 60% of the “mix” while NDC 3 is 8%. The impact of the spread on NDC 2 is now much more significant on an overall basis, bringing the weighted average cost for this mix up to $0.73 per unit, with a pricing spread of $0.16 per unit.

To avoid this type of mix distortion, it was critical that we use the pharmacy information acquired as part of this study only to derive NDC-level unit revenue and rely on the state’s publicly-reported utilization for our mix.

15.7 DATA VALIDATION

Due to the limitations in the state utilization data, it was especially important to validate the finished database before using it to analyze generic spread pricing. Conveniently, the database includes a built-in validation mechanism – brand-name drugs.

In Medicaid, spread is predominantly a managed care generic drug phenomenon. As discussed earlier, this is the case because of the latitude the PBM has within different contracts between the payer and the pharmacy to price generics differently and capture the arbitrage between the two price points, both of which they control. For brand-name drugs, this is not the case because both payer and pharmacy contracts tend to be based on the same benchmark – AWP – and AWP is strongly correlated to NADAC for brand-name drugs.\(^{36}\) In other words, for brand-name drugs, AWP acts much more like a “market price,” at least before factoring in rebates to the supply chain.\(^{37}\) As such, brand-name drugs become a

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\(^{37}\) Of course, the true price obfuscation on brand name drugs come in the form of rebates, which are beyond the scope of this report. But due to the more transparent nature of Medicaid rebate program, this tends to be less of an issue for Medicaid than it is for Medicare Part D or commercial plans.
A good validation point for our data set. All three price points – state payment, pharmacy reimbursement, and NADAC – should line up closely for brand-name drugs, and trend together over time.

And this is exactly what we find in the data. Figure 38 shows the comparison of the weighted average of the per unit cost benchmarks for all brand-name oral solid drug claims in the database. The state payment and pharmacy reimbursement are practically identical, and at a slight premium (4%) to the weighted average NADAC cost per prescription.

Figure 38 - Michigan Medicaid Managed Care Weighted Average Cost per Prescription (Oral Solid Brands Drugs)

Figure 39 drills down to the NDC Description level to better understand the relationship between what Michigan Medicaid managed care paid for brand-name oral solids and what PBMs paid out to pharmacies on managed care claims. The y-axis is the state payment per unit, while the x-axis is the pharmacy revenue per unit. The analysis was performed for all brand-name oral solids dispensed at the Michigan pharmacies included in our study in 2017. As the chart clearly shows, there is a near perfect correlation between the state managed care payment and the pharmacy revenue ($R^2 = 0.9944$). This confirms that there is no material pricing arbitrage being exploited within brand-name drugs, as we expected given the more aligned nature of the PBM contracts on either side of the transaction.
16 STUDY ASSUMPTIONS, LIMITATIONS AND MITIGATING FACTORS

In this section, we call specific attention to the key assumptions and limitations of this study. We also explain factors that mitigate the impact of our assumptions and enhance the relevance of this study.

16.1 THIS STUDY IS NOT AN AUDIT

The first and most important notice is that this study is a data analytics project. **It is not a claim level audit.** We use the logic and techniques described in detail throughout this report to derive learnings from the data and ultimately **estimate** spread pricing in Michigan. However, if Michigan desires a precise calculation of spread pricing, we strongly recommend that the state perform a full claim-level audit of the program.

However, we believe the learnings from this study strongly indicate that there is meaningful spread pricing being extracted by PBMs in Michigan Medicaid managed care. This study is based on an extensive database containing pharmacy reimbursements provided by 451 pharmacies. In any given quarter, the study captures 3,900-4,300 NDCs dispensed in managed care that roll up to 950-1,000 unique generic drugs representing between $32 million and $38 million in gross spending. The NDCs captured in this study are responsible for nearly 60% of Michigan Medicaid managed care’s overall spending on generic drugs (**Table 13**).\(^{38}\)

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\(^{38}\) This comparison is relative to only NDCs that are present in the NADAC database. Roughly 97% of all generic NDCs are present in the NADAC database.
Unfortunately, PBMs impose barriers that make it difficult for community pharmacies to dispense specialty drugs. As such, we suspect that some of the more expensive specialty drugs could be missing from our study, which could potentially result in an underestimation of PBM spread.

### 16.2 LIMITATIONS OF CMS’ STATE UTILIZATION DATABASE

We used CMS’ state utilization database (SDUD) to obtain gross costs by NDC to Michigan Medicaid managed care. There are four main limitations of this database:

1. It does not specify the MCO – only managed care or fee-for-service
2. It is only produced on a quarterly basis with aggregated pricing data
3. Spending on several NDCs are suppressed
4. Units of measure are not specified

#### 16.2.1 No Specification of MCO

Ideally, we would have liked to match state cost to pharmacy reimbursement for each individual MCO, but without this level of detail in the SDUD, we instead aggregated all pharmacy data to the overall managed care level to compare with the reported state costs. This introduces error in the comparison because there will be times where we are comparing a weighted average pharmacy reimbursement comprised of one mix of plans with state costs aggregated from a different mix of plans.

#### 16.2.2 Data is only provided on a quarterly basis with aggregated pricing data

State utilization data is only provided on a quarterly basis for each NDC. This creates a potential timing error in comparing state utilization data (which is a true quarterly average) to pharmacy data (which is derived from discreet points in the quarter).

While this could add some error to any individual quarter’s absolute spread estimate, the error should be substantially lower when looking at the relative analysis over the study’s nine-quarter span.

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16.2.3 Spending on several NDCs are suppressed

To comply with the HIPAA Privacy Act, CMS suppresses the expense, number of units, and number of prescriptions for all NDCs where less than 11 prescriptions were dispensed in any given quarter. As such, the raw spending information available in the state utilization data that we used does not reflect the full spending by Michigan Medicaid managed care.

16.2.4 Units of measure are not specified

SDUD does not specify the units of measure that states are reporting to CMS for different NDCs. This introduces risk to any analysis that attempts to calculate unit costs in SDUD for drugs that are not oral-solids (i.e. inhalers, pens, drops, injectables, etc.) and compare them to other cost databases. Simply put, the units of measure could be different, which will lead to an apples-to-oranges unit cost comparison. To mitigate this risk, we chose to limit the drugs analyzed in this study to oral solids (e.g. tablets and capsules) where the chance of a unit mismatch is negligible.

16.3 State Rebates on Generic Drugs Not Included

This study does not include Michigan Medicaid managed care rebates on generic drugs. We do not see this as a legitimate study limitation, because state rebates on generic (non-innovator) drugs are independent from the gross cost to the state. The rebate is a fixed 13% of Average Manufacturer Price (AMP), an altogether different pricing benchmark that is not influenced by the state’s reported gross cost. In result, the state will receive the same rebates no matter the unit cost its managed care organizations report. We believe this fact makes the consideration of rebates irrelevant to this study.

16.4 Large Chain Reimbursements Are Not Captured in Our Database

This study only attempts to estimate the percentage of spread based on community pharmacy reimbursements. In Ohio, HealthPlan Data Solutions (HDS) found that CVS/Caremark paid its own CVS pharmacies 3.4% less on generic drugs than it paid to Ohio independent pharmacies. Whether the money goes to CVS pharmacies or Caremark is largely irrelevant as they are both part of CVS Health. But this does raise the question on how much Caremark is paying to large chain competitors such as Walgreens, WalMart, Rite Aid, and others. If large (non-CVS) chain reimbursements in Michigan are lower than community pharmacy reimbursements, this study could underestimate actual spread in Michigan Medicaid managed care.

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40 Starting in Q1 2017 a CPI penalty was also added to the generic rebate formula
16.5 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. 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. This significant level of NDC coverage for generic drugs mitigates the risk introduced by the voluntary nature of the survey, in our view.

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RECOMMENDATIONS

This study identified a critical problem with the design of Michigan’s managed care prescription management program. Contracts between MCOs and PBMs, which are likely based on stale and uncompetitively set AWPs, are preventing the state from realizing the immediate benefits of generic drug deflation. Meanwhile, there is no oversight over what providers receive for services, enabling PBMs to set uncompetitively low pharmacy reimbursements, if they so choose, and profit off the spread between their ability to “buy low” from the pharmacy and “sell high” to the MCO. Moreover, it is not clear whether the MCO is necessarily concerned about “buying high” given that they are paid based on a capitation arrangement and any overstatement of medical spend could help improve their Medical Loss Ratio (MLR). Altogether, we believe that the incentives within the current managed care prescription management system will not deliver long-term sustainable reductions in drug costs. The state must either simplify the design of the system or create proper incentives.

Should Michigan opt for a simpler design, we recommend the state implement a transparent, full pass-through model within Medicaid managed care that is based on actual acquisition cost plus a dispensing fee set by the state at a level that will ensure patient access and promote effective pharmacy competition.

We also recommend the state conduct a thorough analysis to assess the cost/benefit of carving out the entire Medicaid prescription benefit to fee-for-service. To conduct this analysis appropriately, Michigan should not only assess the cost impact of a carve out on historical managed care utilization, but also remodel utilization based on the state’s fee-for-service preferred drug list (PDL). We suspect that the state will see favorable movement in both drug ingredient costs and rebates by moving to a PDL that is unencumbered by the warped financial incentives present in the current managed care benefit design.

Should Michigan only choose to repair incentives within the existing system, we recommend that the state take the following actions:

- Remove AWP-linked guarantees from MCO/PBM contracts
  - Do not replace AWP with Wholesale Acquisition Cost (WAC) – while we did not review generic WACs in this report, they are no more accurate a benchmark for generic costs than AWP
- If AWP is not removed from PBM/MCO contracts, the state should require MCOs to negotiate contracts more frequently to raise GER. Or MCOs should include a mechanism by which the GER discount steps up each quarter to more accurately reflect the increasing acquisition cost discount to AWP. There also should be some mechanism for the increased savings to get returned to the state.
- Conduct a “best price” analysis of the cost (and GER contract guarantees) private employers – that are of similar scale and size to Michigan MCOs – are paying for their pharmacy benefits
- Mandate that each PBM uses a single base MAC list for all providers. Allow for tiering of provider MAC lists to account for provider size and purchasing power. Have the PBM apply the

same provider MAC list to the MCO. Have PBMs provide basis for setting MAC rates (i.e. pharmacy invoice/cost surveys)

- Institute a periodic MAC-list review process to ensure PBMs are setting rates fairly for providers
- Either prevent GER contracts between PBMs and providers within Michigan Medicaid, or ensure that Michigan has visibility to net pharmacy reimbursement on generics after GER true-ups, on a claim level basis
- Adjust MCO capitation payment to penalize the MCO for poor management of drug costs (relative to acquisition cost) thereby creating the incentive for the MCO to better monitor its PBM.
ABOUT 3 AXIS ADVISORS

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 non-profit 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.