NCPDP Foundation RTPB Grant: Final Report

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EXECUTIVE SUMMARY

The real-time prescription benefit (RTPB) standard was developed by a multi-stakeholder, consensus-building process led by the National Council for Prescription Drug Programs (NCPDP). A standard format for data exchange is essential for enabling the prescriber, pharmacy, and pharmacy claims processor to exchange real-time information about a patient's drug benefit coverage and out-of-pocket cost prior to prescribing and dispensing. By standardizing the data elements and process of exchanging data between an electronic medical record (EMR), an intermediary, and a pharmacy benefit manager (PBM), there is significant potential to directly impact the price transparency landscape and reduce out-of-pocket costs for patients. In 2019, the NCPDP Foundation selected our research team from Johns Hopkins Medicine to validate the RTPB standard developed by the RTBP Task Group under the Maintenance and Control Workgroup in a real-world clinical setting.

This final report, prepared for the NCPDP Foundation, summarizes our findings on how the RTPB standard enables the provision of patient specific benefit and cost information at the right time in a provider's workflow. As reflected in previous milestone reports, we initial received acknowledgment from our Institutional Review Board (IRB) that our study protocol was exempt, and that data analysis could proceed. We spent a significant amount of time laying the groundwork for successful data extraction from the EMR and our outpatient pharmacy system. For a subset of patients for whom a medication was e-prescribed and sold at a Johns Hopkins outpatient pharmacy), we compared the price estimates returned by the transaction with the actual amount paid by the patient. Having access to our internal pharmacy claims data, as well as the price estimate returned by the transaction in our EMR enabled this approach. We subsequently expanded the study time-period to include medication orders through January of 2020 and analyzed data on orders sent to non-Hopkins outpatient pharmacies as well.

The focus of our most recent work was to summarize the types of changes to medication orders we are seeing in the outpatient settings following implementation of the real time tool. The ability of the real-time transaction to impact patient costs, provider ordering, prior authorizations, coverage status, and other aspects of the medication ordering workflow are demonstrated based on our findings from the first 6 months of implementation.

BACKGROUND

A previous survey presented in an NCPDP/HIMSS Specialty Pharmacy educational webinar revealed that patients receiving specialty medications are not aware of the costs of those medications and do not understand their benefit coverage[1]. Specifically, 65% of those surveyed did not know the cost of their medication when they left the provider's office, 58% did not know if insurance would cover their medication, and 53% did not know if a discount could apply towards their insurance deductible.[1]

Summary of Identified Clinical Workflow at Johns Hopkins

The Real Time Benefit Tool (RTBT) from Surescripts went live in the Johns Hopkins electronic medical record (EMR) July 2019. In the early stages of our project, we sought to identify each individual step in the process when a patient presents to an ambulatory clinic appointment.

The process flow of the transaction is as follows:

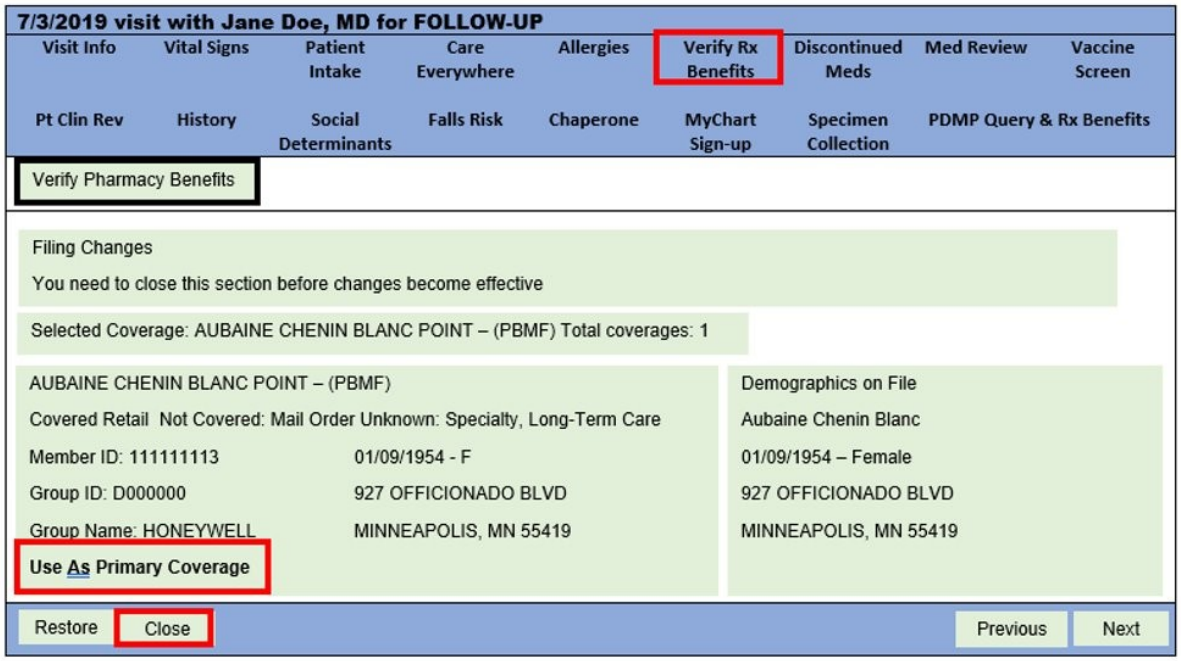
1. Provider or pharmacy originates a Request from their practice management system.
2. Pharmacy Claims Processor adjudicates the Request and communicates a Response in real-time.
3. Electronic Medical Record receives the Response and presents the details in the provider's workflow.

Figure 1. RTPB Transaction

Response details can include information about the patient cost of the drug prescribed, cost of alternative drugs, drug insurance coverage, prior authorization required, etc. The development of this transaction will greatly assist with the growing complexity of claims adjudication due to the growth in Specialty drugs. By 2021, it is expected that 50% of U.S. prescription drug spend will be Specialty medications[1].

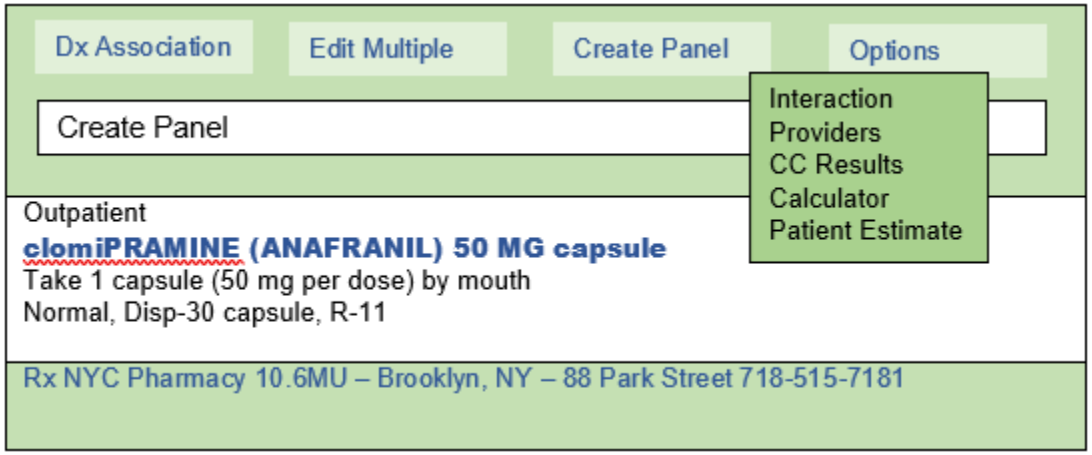
When a patient comes in for an ambulatory clinic appointment, during the patient rooming process the nurse or medical assistant sees a screen in the EMR (Figure 2 includes a mock-up). Patient's pharmacy benefits must be verified for the RTPB transaction to take place. At the time of this report, if this essential pharmacy benefit verification step has not been performed, the RTPB transaction cannot be initiated.

Figure 2. EMR Patient Rooming Process Example Screen



There are two ways in which a medication estimate can be generated: an active request from the prescriber at the time of ordering or automatic initiation of the RTPB transaction based on pre-set criteria being met in the EMR. At the time of placing a medication order, the provider may manually activate the tool prior to finalizing the order. After placing the preferred medication order (any order except a direct refill of existing order) the provider may select Patient Estimate to generate a preliminary cost and potential alternatives (See Figure 3).

Figure 3. Manual Tool Activation Example



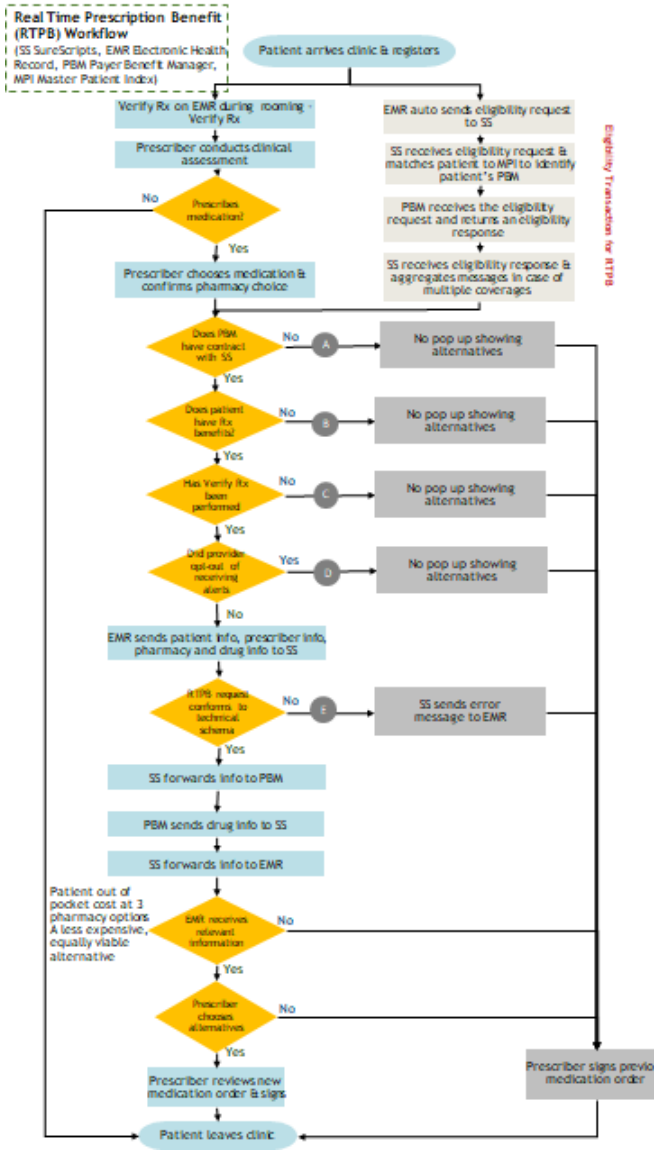
Alternatively, and what likely occurs most frequently, upon signing a new medication order, the RTPB transaction is initiated and a request is sent. If there is a successful response, an estimate is returned and if pre-set thresholds are met, the alternatives and estimates are displayed in the EMR. In the image below (Figure 4), an RTPB transaction was initiated for an order of Ambien (generic zolpidem) 10mg #30 tablets. The request was sent to the intermediary (SureScripts), after which the message was forwarded to the PBM. In this instance, the member's PBM returned a message to the intermediary, and the payer-suggested alternatives were returned to the EMR. At the time of prescribing, the EMR displayed the out of pocket-of-cost estimate for the member as well as some lower cost alternatives. If the order were changed to zolpidem generic, the cost to the member would have been reduced from $200 to $15 for a 30-day supply. If the provider changed to eszopiclone, an alternative medication in the same class for insomnia, the cost would have been $38 for a 30-day supply.

The provider can then click the radio button beside the existing original order or change to an alternative that is shown based on potential cost savings by therapeutic alternative, pharmacy change, or day-supply change. The cost shown is an estimate for what the patient would pay. In some instances, the plan's cost information is returned as part of the transaction, but at present, our enterprise EMR's user interface is not configured to display the plan cost information.

Figure 4. Preliminary Patient Estimates

The following is a summary of the RPTB clinical workflow at out institution.

Figure 5. RTPB Clinical Workflow



METHODS

We focused on outpatient encounters at Johns Hopkins Medicine outpatient clinics from July 14, 2019 through January 14, 2020. This covers the 6-month time period after implementation of the RTPB tool. We evaluated types of changes made to medication orders, cost savings associated with such changes, and compared the costs paid by patients out of pocket to the price estimates displayed in the RTPB tool at the time of ordering.

Data for encounters, including provider type, patient demographics and initial medication order selection were extracted from the EMR (Epic, Verona, WI). Several data elements, including the alternatives displayed to providers, were obtained by the Epic team in close collaboration with the intermediary responsible for data transmission between Epic and patients' PBMs' claims processor (Surescripts, Arlington, VA).

Estimated costs for the alternatives displayed within RTPB were compared with the payment made by patients at the point of sale. Such validation was performed, for patients who received their prescription(s) from one of the nine Johns Hopkins Outpatient Pharmacies (JHOP). The point-of-sale data and several other characteristics were obtained from JHOP's pharmacy system software (McKesson Pharmacy Systems, Irving, TX).

RESULTS: DESCRIPTIVE

From July 14, 2019 to January 14, 2020, there were 582,120 encounters at Johns Hopkins Medicine that took place in an ambulatory or hospital outpatient setting. At least one medication order was placed in 199,404 of these encounters, for a total of 368,632 medication orders. Of those medication orders, there were 138,861 orders for which a medication estimate was returned by the RTPB transaction.

These took place in 158 unique department/clinic sites. The encounters were completed by 2,016 unique providers representing 38 provider types. The most common providers for the ambulatory patient encounters of interest are summarized below (Table 1).

Table 1. Total Encounters by Provider Type

Provider Type	Number of Total Encounters
Physician	63352
Nurse Practitioner	14183
Resident	2882
Registered Nurse	1918
Physician Assistant	1790
Generic Resource	1695
Midwife	816
Medical Fellow	388
Pharmacist	191
Optometrist	149
Dentist	129
Medical Assistant	89
Therapist	83
Podiatrist	33
Clinical Pharmacist Practitioner	24
Licensed Practical Nurse	14
Community Health Worker	4

As one would expect, the most common specialties, when associated with a provider, were primary care: internal medicine, family medicine, and pediatrics. Other common specialties in which the encounter provider worked were ophthalmology, psychiatry, oncology and obstetrics & gynecology.

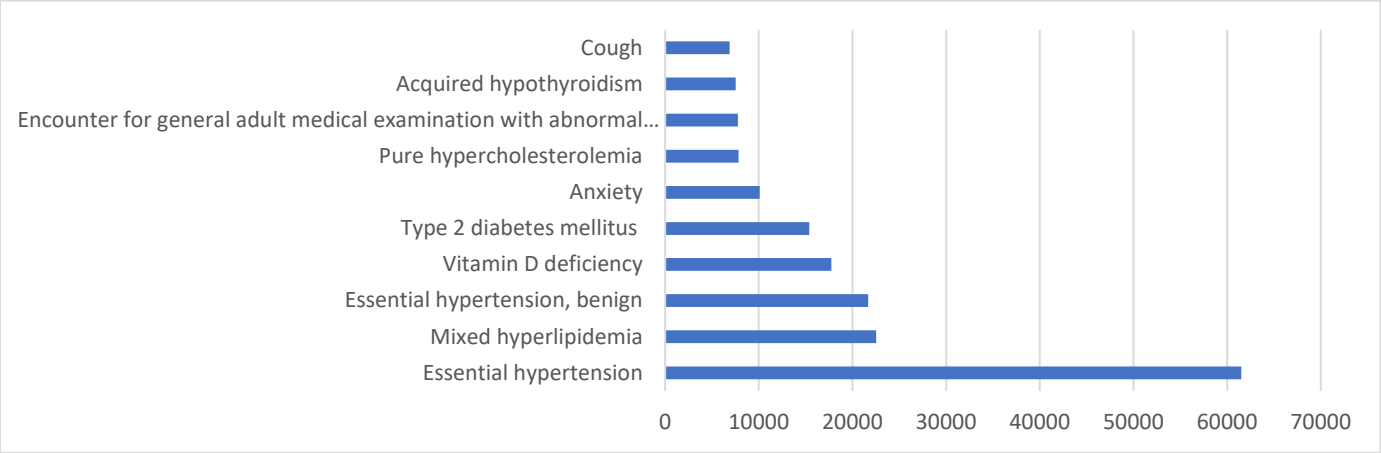
Table 2. Patient Demographics

Gender (n=245,083)	
Male	100,593
Female	144,471
Unknown	19
Ethnicity (n=245,083)	
Not Hispanic or Latino	224,219
Hispanic or Latino	14,976
Unknown	3,759

A majority (59%) of the patients seen were female and not of Hispanic or Latino ethnicity (see Table 2).

The most common primary diagnosis code associated with an ambulatory encounter was “Encounter for Immunization”, which is unsurprising as the data collection period overlapped with back-to-school and flu season. Other very common diagnoses codes included “Need for vaccination”, “Encounter for routine child health examination without abnormal findings”, “Encounter for Medicare annual wellness exam” and “Routine general medical examination at a health care facility”. Once these diagnosis codes were removed, the most common treatment diagnoses were as seen below (Figure 5).

Figure 5. Primary Diagnosis Codes for Encounters



Medication Order Cohort

The most common provider types were: Physician & Nurse Practitioner (see Table 3).

Table 3. Encounters by Number of Signed Medication Orders

Provider Type	Encounters in Which an Order Was Signed for at Least 1 Medication	Encounters in Which an Order Was Signed for 2 or more Medications
Physician	145353	63352
Nurse Practitioner	31054	14183
Resident	5127	2882
Physician Assistant	4434	1790
Registered Nurse	3813	1918
Resource	3625	1695
Midwife	2880	816
Fellow	668	388
Medical Assistant	661	89
Optometrist	607	149
Pharmacist	451	191
Dentist	259	129
Podiatrist	169	33
Therapist	159	83
Clinical Pharmacist Practitioner	63	24
Licensed Practical Nurse	54	14
Research Staff	14	1

The encounters in which at least 1 medication order was placed were spread across 128 departments, essentially 80%, of the departments in which a patient was seen. 1,371 unique providers divided across 25 unique provider types and 59 specialties ordered at least one medication for

their patient. 87,745, or 15% of all encounters that occurred, had two or more medications ordered for the patient. These encounters occurred over 128 departments by 1,127 unique providers across 20 unique provider types and 56 specialties.

Surescripts has provided the project team with the median network transaction times below (see Table 4).

Table 4. Surescripts Response Timing Data

Network Response Time	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19
Median Response Time	1.7s	1.7s	1.7s	1.6s	1.8s	1.8s

Surescripts data indicate that approximately 15% of the returned information from PBMs includes plan cost information. This is not shown on the EMR user interface to providers. The project team is actively investigating the percent of patients who were eligible for a transaction to occur but has not yet been able to access the correct data table in the EMR. The goal will be to compare the percent eligible to the percentage of time the tool fired. Additionally, the project team is working to investigate when the tool fires automatically and when it is actively selected as a Patient Estimate.

Table 5. PBM Transaction Volume Breakdown

PBM Transaction Volume Breakdown	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19
CVS Caremark	77.18%	78.62%	79.09%	78.05%	74.63%	75.33%
Express Scripts	18.73%	17.47%	17.34%	18.03%	17.86%	17.12%
DST Pharmacy Solutions	3.97%	3.84%	3.44%	3.74%	7.38%	7.44%
Other	0.13%	0.07%	0.13%	0.17%	0.13%	0.12%

Table 6. Average Estimated Patient Pay

Average Estimated Patient Pay	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19
($)	17.34	17.03	17.73	16.83	16.57	18.70

RESULTS: TYPES OF CHANGES MADE

It is important to note that just because a medication estimate is returned, it does not mean that the estimate is necessarily displayed to a provider. There are additional institution and vendor specific criteria that need to be met for displaying the estimates and alternatives. There are also prescribers who may have opted out of receiving this information. At the time of implementation of the tool, the criteria for displaying an alternative to a provider was determined at the health system-level based on the following suggestion decision points:

- Alternative price difference threshold (default 0-any cheaper medication is shown)
- Price threshold to show alternatives (default 0-all medications are shown)
- Max alternatives to show (default=5)
- Sorting method (default=less expensive)
- Provider has not opted out of receiving pop-ups

If the RTPB returns a price estimate that meets the decision points listed above, the pop-up message should appear in the EMR interface with the estimated price and suggestions for alternatives. If the RTPB returns an estimate that does not provide alternatives with a lower cost, or the provider opted out of seeing the pop-up, nothing would display even though there is technically an estimate generated. At the time of this analysis, the total number of times when an estimate was displayed cannot be definitively identified based on limitations in the tracking features of the EMR.

We focused on a subset of 1,572 distinct orders for which an estimate was returned based on a successful RTPB transaction, AND where there was confirmatory evidence that a provider took an action via the tool to choose an alternative. Table 7 provides a summary of the types of changes and the percentage of time a change was made. An order may be counted more than once in the table below, as a provider may have made a change to more than 1 category. For example, a real time transaction could be triggered based on an order for Valacyclovir 1gram tablet for 30 days via retail, and the alternative displayed was for Valacyclovir 1gram tablet for 90 days via mail order. If the provider chose that alternative, we would count that switch in the Pharmacy Type, Pharmacy, and Day-Supply rows below.

Note that we are limited in our ability to calculate true change rates, due to the absence of consistently reportable data on the user action selection, as well as the inability to consistently distinguish between instances where an estimate was returned and those where it was displayed to the provider. Therefore, these numbers reflect instances where changes were made to the initial selection.

As seen in Table 7, the most common types of changes made in response to the RTPB were to the day-supply, drug coverage status, Drug ID, quantity ordered, and prior authorization requirements. The most frequently occurring change to day-supply (76% of all changes) was from an original order with 30-day supply changed to a 90-day supply. This is one key area where the data provided from the real time transaction is

helpful in moving patients from a 1-month supply to a 3-month supply of medication. While adherence increases with longer day- supply of prescriptions, the cost of three copays in one often is a barrier for patients. The RTPB demonstrates how may PBMs incentivize patients to fill 3-month supply by discounting the copay so that the patient pays a lower price-per-day than they would with a 30-day supply.

Table 7. Summary of types of changes made to medication orders[*]

Categories in which changes were made	Total changes made (n)	Total Changes made (%)
Day-Supply	686	44
Drug Coverage Status	541	34
Drug ID**	512	33
Quantity	1085	69
Prior Authorization Requirement	452	29
Pharmacy Type[ǂ]	429	27
Pharmacy[ǂ]	429	27
Quantity unit	124	8

[*]Number of orders for which an estimate was returned (successful RTPB transactions) is 1572 for all rows.[**]Drug ID is the unique identifier assigned to a medication product and formulation in the Epic EMR. Of note, a change in Drug ID may be a change between brand names (Proair v. Ventolin), formulation, or even medication name despite being the same formulation, delivery mechanism and molecule (MAPAP 650mg ER and Acetaminophen ER 650mg). [ǂ]In our data, the pharmacy type and the pharmacy switch were identical as in each instance, a pharmacy switch represented change of the setting as well.

One question that arose was regarding whether there were instances of changes from a 30-day supply in retail setting changed to a 90-day supply within retail. This happened 372 times where a day supply change was one month to 3 months while remaining in the retail setting. In comparison to 119 times where the day supply change was from 1 month to 3 months and changed from retail to mail order setting.

The most common type of Drug ID changes observed were changes in formulation (e.g. metformin ER tablet formulations, changes from capsules to tablets or cream to ointment) or change to a manufacturer of preference for an inhaler. A sampling of the observed Drug ID changes can be found in Table 8. Many of the Drug ID changes were of minimal clinical significance. Converting from one ER formulation of metformin to another will not impact the patient's diabetes control but may provide a financial benefit to the patient. Similarly, changing between different fluoroquinolone eye drops or the type of topical corticosteroid is unlikely to change the clinical course for the patient. An ordering provider wants to start metformin ER or start a short course of Amoxicillin but is likely to be less focused on the specific formulation of the product. In

these instances, the aspiration is that the RTPB standard can enable lower cost alternatives being chosen without changing the efficacy of therapy. Moreover, change during the prescribing stage would significantly reduce the administrative burdens and delays by reducing coverage related interactions between a pharmacy and a provider's office.

Table 8: Drug ID changes (most frequently observed)

Original Drug ID	Alternative Drug ID selected	No. of Changes
ALBUTEROL SULFATE HFA 90 MCG/ACTUATION AEROSOL INHALER	VENTOLIN HFA 90 MCG/ACTUATION AEROSOL INHALER	32
AMOXICILLIN 500 MG TABLET	AMOXICILLIN 500 MG CAPSULE	19
CLOTRIMAZOLE 1% TOPICAL CREAM	KETOCONAZOLE 2 % TOPICAL CREAM	19
MOXIFLOXACIN 0.5 % EYE DROPS	CIPROFLOXACIN 0.3 % EYE DROPS	18
ALBUTEROL SULFATE HFA 90 MCG/ACTUATION AEROSOL INHALER	PROAIR HFA 90 MCG/ACTUATION AEROSOL INHALER	15
DOXYCYCLINE MONOHYDRATE 100 MG CAPSULE	DOXYCYCLINE HYCLATE 100 MG CAPSULE	14

Regarding changes to the quantity of medication based on alternatives returned by the transaction, the most common type of change was from a quantity of 30 to a quantity of 90 (30% of all quantity changes), followed by inhaler quantity changes (10%), and then changes from a quantity of 60 to 180 (7%). There were 923 instances in which the switch led an increase in the quantity of medication ordered, and 162 orders where the switch led a decrease in the quantity ordered.

The other leading category of change was regarding prior authorization requirements. With consistent increases in medication list prices, prior authorization criteria implemented by insurers have ballooned, representing nearly 25% of all covered drugs under Medicare Part D in 2019 (a 16% increase since 2007).[2] The prior authorization approval (PA) process is the most time-consuming utilization management strategy, and one which is difficult to predict by providers due to annual changes in benefit and formulary designs. A survey conducted by the American Medical Association (AMA) in 2018 found that physicians perceived prior authorizations to be associated with negative clinical outcomes, time consuming, prescription abandonment and burden on their practice.[3] RTPB can potentially play a role in reducing this burden by informing the provider during the decision-making process whether their agent of choice is associated with a PA, and whether alternatives without PA criteria are covered on formulary. We observed that the RTPB was able to guide a provider in selecting an alternative which was known to not have a PA

edit associated with it. (Combined change from a known PA edit AND unknown PA status to an alternative which did not have a PA edit accounted for approximately 67.7%). A breakdown of the changes to prior authorization status is in Table 9.

The pharmacy type changed from mail order to retail 18 times and from retail to mail order 411 times. The most common specific pharmacy change was from a specific brick-and-mortar pharmacy to its mail-order counterpart. Mail order pharmacy services often provide cost savings for many patients but may not be appropriate for patients who require short term therapies, frequent evaluation, or dose titrations. Currently, many patients become aware of potential cost savings with the use of mail order pharmacy after already obtaining the prescription from retail pharmacy, or upon arriving at the pharmacy. Elimination of delay in such knowledge may lead to cost savings by early selection of mail order pharmacy when clinically appropriate and practical.

Table 9: Prior Authorization changes

Original Drug ID	Alternative Drug ID selected	No. of Changes
PA Not Required	PA Status Unknown	112
PA Not Required	PA Required	26
PA Status Unknown	PA Not Required	250
PA Status Unknown	PA Required	3
PA Required	PA Not Required	56
PA Required	PA Status Unknown	5
	TOTAL CHANGES	452*

**Out of total of 1,572 records.*

A variety of changes discussed above from Table 7 coincided with changes in coverage status as well. The most common change made to drug coverage status was a switch from “covered with restrictions” to “covered”, which accounted for 47.9% of the changes in that category. The details of drug coverage status changes are summarized in Table 10:

Table 10: Drug Coverage Status Changes

Original Drug Selected	Alternative Drug Selected	No. of Changes
COVERED WITH RESTRICTIONS	COVERED	259
COVERED	COVERED WITH RESTRICTIONS	169
NOT COVERED	COVERED	82
NOT COVERED	COVERED WITH RESTRICTIONS	30
COVERED WITH RESTRICTIONS	NOT COVERED	1
	TOTAL NUMBER OF CHANGES	541*

**Out of total of 1572 records.*

By converting from an agent covered with restrictions to covered without restrictions or converting from not covered to covered with restrictions, the RTPB tool increases the likelihood that the patient can procure the prescribed medication without delay. It is hypothesized that the 169 instances in a Covered medication was changed to a medication that was Covered with restrictions was as a result of converting from a 30-day to 90-day supply since many 90-day supply prescriptions are restricted to mail-order pharmacies.

POTENTIAL COST SAVINGS

Two separate approaches to patient cost savings can be reported based on data available from the EMR: the potential cost savings for a patient at the time of dispensing (which does not factor in day-supply) as well as the potential cost savings calculated as a cost-per-day difference (to account for variations in day-supply between the original and alternative order). There were 905 times where an order was changed that led to a reduction in out-of-pocket cost for the patient. The maximum potential cost reduction was $2,370.05, which occurred when emtricitabine-rilpivirine-tenofovir was switched from retail to mail order. Another example where there was a significant delta in potential cost savings was for an oral antidiabetic agent. A switch from a formulation that was covered with restrictions to another that was covered without restrictions led to the order being $1,002.90 less in out-of-pocket cost for the patient. The average cost savings for all orders in which a change in out-of-pocket cost could be calculated was $21.40, with a median of $4.

There were 1,366 times where an order was changed and led to a potential reduction in out-of-pocket price-per-day cost to the patient. The maximum potential cost reduction based on estimates returned from the real time tool and what the original patient pay would have been was $79.05. The average price-per-day cost reduction was $1.09, with a median of $0.20.

One limitation on potential cost savings is that clinicians have the ability to opt-out of receiving the pop-up. By clicking once, on a "Don't suggest alternatives while signing" box the RTBT is suppressed indefinitely for all patients that user sees.

COST VALIDATION IN HOPKINS SUBSET

For the larger round of cost validation, we looked at medication orders between July 14, 2019-January 14, 2020 where an out-of-pocket price estimate *was returned* by the real time transaction during an outpatient encounter and the medication was e-prescribed to a Johns Hopkins Outpatient pharmacy. We then limited the analysis to those medication orders that were *marked as sold* (so excluding those where the fill status was Cancelled, In Process or NULL) – this allowed a direct comparison of the estimated patients' out of pocket (OOP) costs displayed in RTPB and actual OOP payment at the pharmacy. There were 6,159 medication order where an estimate was returned (not necessarily displayed to provider) and was marked as sold at one of the following 9 outpatient pharmacies:

- Johns Hopkins at the Arcade-1800 Orleans Street, Baltimore, MD
- Johns Hopkins at Weinberg-401 N. Broadway, Baltimore, MD
- Johns Hopkins Outpatient Pharmacy-601 N. Caroline Avenue, Baltimore, MD
- Johns Hopkins at Viragh-201 N. Broadway, Baltimore, MD
- Johns Hopkins at Monument Street-1810 E. Monument Street, Baltimore, MD
- Johns Hopkins at Bartlett Practice-1717 E. Monument Street, Baltimore, MD
- Johns Hopkins at Bayview Medical-4940 Eastern Avenue, Baltimore, MD
- Johns Hopkins at Bayview Annex-4940 Eastern Avenue, Baltimore, MD
- Johns Hopkins at Greenspring-10755 Falls Road, Lutherville, MD

Of those medications that were marked as sold, 783 were for an order where an alternative was not chosen. 96 of the orders were for a medication where the provider did choose an alternative following the return of an estimate at the point of ordering. This number reflects those instances where a provider viewed the prompt for alternative order(s), and selected one of such alternatives to maximize coverage potential and/or minimize patients' out of pocket costs.

We then eliminated any medication orders where the actual quantity dispensed differed from the quantity that was ordered (and therefore the quantity for which the medication estimate returned by the real time transaction was based on). These differences in ordering quantity and dispensing quantity may have been due to patient preference, provider error adjusted by the pharmacy, package/unit availability or insurance restrictions. Inhalers were not eliminated. This left us with 64 medication orders where the medication was dispensed as prescribed. **For 98% of these orders, the price paid by the patient was less than, the same or no more than 3 cents greater than the estimate returned by the RTPB**

transaction. For the 64 orders that met inclusion criteria for the cost validation, the estimate that was returned for the initial medication orders ranged from $0 to $100 with an average cost of $8.20. The actual amount paid out-of-pocket by patients at the pharmacy ranged from $0 to $96.90 with an average cost of $6.03.

Cost differences, whether positive or negative, may be due to use of a different benefits plan, use of a manufacturer's voucher or discrepancy in deductible status at the time of RTPB estimate and prescription dispensing (including difference in staging for the Medicare coverage gap). Our study team was unable to validate that the PBM used to generate the RTPB estimate was the same and only PBM billed by the pharmacy when dispensing the product.

PROVIDER FEEDBACK:

Since going live with the RTBT in July 2019 at Johns Hopkins Medicine, there has been a significant increase in awareness from prescribers about the tool. Following the initial upgrade during which the tool became active in the production EMR, webinars and in-person meetings (prior to COVID) have been conducted with specific emphasis on interpretation of the alternative recommendations and generation of cost estimates. These interventions were intended to promote increased adoption and appropriate use of the tool. Johns Hopkins Community Physicians and allied providers, and Johns Hopkins Hospital are also utilizing the benefits of the RTBT in a collaborative Joy of Medicine Initiative to increase satisfaction and reduce provider burnout.

In the initial months after Go-live, providers expressed hesitancy on whether they could relay the price estimate to patients with certainty Adoption of the tool varies based on provider trust of the cost estimate. Some providers give the patient the price as price-range with the RTPB estimate included in the price range. Others give the exact estimate as the price the patient should expect to pay. A small group of providers reported they do not provide the patient the price estimate but use the tool to confirm that their medication order is cost-effective in the therapeutic class.

Since the price validation study has demonstrated accuracy of estimates, provider confidence in the RTPB transaction has grown. Some providers see data in the tool as a validation that they are often already ordering the insurance-preferred product for the patient. Others consider it to be a validation that they are already ordering the lowest cost or sending to the lowest-cost pharmacy. Although mail order pharmacies are often associated with greater cost savings, providers indicate that they often select retail pharmacies because of patient preference or other compelling reasons. Providers believe that time taken to request RTPB estimate and the pop-up alerts do not negatively impact their workflow. They do not find it to be time-consuming except for when it generates an alternative that is both clinically and financially identical to what was selected.

Some providers have expressed a desire for the RTBT to "fire" for all their patients, because of confusion resulting from an inability to consistently obtain price estimates for all patients. This is inconsistency is multifactorial: due to limitations in contracting with PBMs, the need for the Rx verification step to have been performed, and other criteria needing to be met for the transaction to be initiated.

One critique of the Rx price transparency has been that alerts populate with negligible cost saving recommendations, often for medication suggestions in the same therapeutic category. Feedback has differed on what an acceptable price difference would be for the tool to populate. The default threshold is set to provide alternatives at any price difference, provided that they are equally or less expensive than the initial order. This leads to numerous pop-ups of the tool recommending equally priced alternatives. Institutions should consider raising the cost-savings threshold so that the tool only suggests alternatives with significant cost savings. Some providers have expressed concerns regarding seeing alternatives for therapies which switches, and alternatives may not be clinically appropriate, e.g. providing alternative antidepressant options for patients who have been chronically stabilized on an antidepressant. The concern is that alternatives may display for serious health conditions in which changing therapy could alter disease state stability.

DISCUSSION

Interest around the country in NCPDP's real-time prescription benefit (RTPB) standard continues to grow. To our knowledge, our study was the 1st funded project to evaluate the accuracy of the cost data estimates returned by the transaction. Since the kick-off of our project, the topic has been presented on at Johns Hopkins Informatics Grand Rounds (September, 2019) where a CME talk by Drs. Danny Lee & Andrew Mellin was titled A network Model of Clinical Decision Support for Medication Price Transparency. We subsequently received $75,000 in funding for a joint study with Kaiser Permanente Mid-Atlantic to evaluate trends in medication ordering since they have not implemented a real time prescription benefit tool. This study is still underway is also eliciting qualitative feedback from providers regarding pharmacy price transparency tools. In November of 2019, our co-PI, Jessica Merrey, PharmD MBA presented some of our early findings at the Architecture of High Value Health Care National Conference. In December, 2019, Dr. Danny Lee hosted a webinar on Real Time Pharmacy Benefits an Drug Pricing for Johns Hopkins Community Physicians. Dr. Merrey also presented at the Pharmacy Quality Alliance's Annual Meeting a talk titled, Impact and Efficacy of a Medication Price Transparency Tool. The Pharmacy Quality Alliance awarded our research team a $75,000 grant to evaluate the impact of the RTPB transaction on patients with barriers to access and care. That study is still underway and involves a more detailed exploration of pharmacy workflows. Most recently, Dr. Fasika Woreta from Johns Hopkins was awarded a $400,000 through a Donaghue grant for a multi-site evaluation of price transparency that involves researchers from Yale as well.

We acknowledge that our initial analysis is susceptible for selection bias for both physicians and patients. We only evaluated results from interactions where the physicians viewed the RTPB tool and did not opt-out of using it. For cost validation, we could only evaluate patients who

picked up their prescriptions at Johns Hopkins Outpatient Pharmacy thereby excluding all patients who may have not picked up their prescriptions due to cost concerns; the cost discrepancy in such instances between RTPB and pharmacy would not be captured in our analysis.

We recognize the patient benefit verification, as part of the intake process, is a limiting step and is necessary for the RTPB tool to function. We are actively engaged in efforts to determine if this process can be automated be leveraging existing benefit information stored with EMR, especially for patients for whom the medical and pharmacy benefit information is linked.

Metrics for future projects include include quantifying successful responses of the transaction, documenting fewer patient complaints, fewer calls to the prescriber's office by pharmacies and patients, and fewer prescriber calls to pharmacies; demonstrating increased workflow in pharmacies due to fewer rejections and calls to prescriber offices. Further studies could also demonstrate increased medication adherence and administrative cost savings. While our study focused on the SCRIPT standard, future evaluation should be done using the Telecommunication Standard version as well.

REFERENCES:

1. Healthcare Information and Management Systems Society. Specialty Medication Workflow – How Standards are Improving the Prescriber and Patient Experience. [Internet]. Chicago. 2018 November 13 [cited 2020 December 3]. Available from: https://www.himss.org/sites/hde/files/NCPDP_HIMSS%20Town%20Hall%20%233%20-%20FINAL.pdf
2. July 2020 Data Book: Health Care Spending and the Medicare Program. Medicare Payment Advisory Commission website. Updated July 17, 2020. Accessed October 19, 2020. http://www.medpac.gov/docs/default-source/data-book/july2020_databook_entirereport_sec.pdf?sfvrsn=0
3. 2019 AMA Prior Authorization Physician Survey. American Medical Association website. Accessed October 19, 2020. https://www.ama-assn.org/system/files/2020-06/prior-authorization-survey-2019.pdf