High Cost Drug Inflation Estimate based on 2018 and 2019 CDS-A and Projection Model Results

Introduction

One of the items the HSCRC sets in the update factor is the drug inflation. Last year 10% was used based on high level numbers from the CDS-A Drug rollforward and related files, external projects and a model that projected inflation based on current year experience at a drug level - the Drug Inflation Model (DIM).

The following memo documents the methodology and outcomes from the DIM.

There are 3 components to drug inflation:

A. Inflation caused by increased use
B. Inflation caused by increased drug specific prices
C. Inflation caused by the change in mix of drugs (prices could go down across the board but if use patterns shift to more expensive drugs average price goes up)

The HSCRC retrospectively adjusts for volume changes and reimburses hospitals for (A). Items (B) and (C) are included in the inflation factor. The DIM is an approach to estimating (B) and (C). And since (C) depends on the volume inflation projecting volume inflation is part of the model.

Data Source

The data source for this analysis is:

(1) The 2019 model uses the current year and prior year volumes from the audited survey for 2019. Where retrospective and prospective estimates differed prospective estimates are used as this is a forward looking analysis. 2018 ASP and 340B submitted prices were applied to the 2018 volumes (as reported in 2019) to capture price inflation from 2018 to 2019 (this pricing of 2018 at 2018 levels is different than CDS-A volume adjustments that value everything in current year prices)
(2) Last year's model used the submitted survey for current and prior year volumes and current and prior year prices, so there is less confidence in both the volumes and the prices since they were unaudited results. Also, since the drug list was changed between 2018 and 2019 surveys the drug list is different.

Modeling Approach

The DIM starts with the basis that this year's trends – both price and volume - for a specific drug, are the best predictor of future trend with two important qualifiers (1) backing out the impact of switching from ASP to 340b on the basis that was non-recurring and (2) normalizing trends where drugs have outlier trends. These qualifiers are discussed further in the relevant section below.

Component (B): Price Inflation

Price inflation is projected by applying the prior year to current year change in cost/dose to the current year value to derive a projected value. In general these changes are small at a drug level, for 2019 over 2018 the vast majority were +/-5%. Therefore these values are simply projected into the future.

However, as 340B programs are introduced and expanded that can deflate the pricing. Continued expansion of 340B is not factored into the inflation adjustment as hospitals are permitted to retain the benefit of switching. Therefore, two approaches are used to remove 340B switching:

(1) Price variance is calculated using the current price regime (ASP or 340B) in both years so the benefit of a new 340B hospital is not impacting the projected price inflation
(2) The mix between 340B and ASP pricing for each specific drug is normalized out. So if the statewide mix moved from 85% to 90% 340B the benefit to statewide average price of that 5% shift is removed. Since most hospitals are 100% 340B or ASP a change in the mix likely reflects volumes moving from ASP to 340B hospitals and since individual hospitals do not benefit from this shift it should not be considered in the projected price inflation

Component (C): Mix-driven Inflation

Mix-driven inflation is predicated on the following assumption – that a hospital's volume adjustment makes them whole for if their total volume changes but not if their volume stays the same but their mix moves to more expensive drugs.

The DIM attempts to project the statewide mix shift and build that into the inflation projection. Since individual drug prices are relatively stable at a J code level the shifting between drugs can be the largest driver of price inflation. In order to evaluate the impact of volume mix changes on pricing it is necessary to first project volume changes (Component A).

The DIM uses a three step process to calculate mix-driven inflation:

1. Project volume inflation for all drugs
2. Calculate impact of projected volume inflation if all drugs trended at the statewide average projected price and volume trend
3. Subtracted result of (2) from (1) – the remainder is variation driven by changes in mix

Generally the volume inflations projections in step #1 follow the same process as price inflation in setting projected trend equal to the most recent period. However, since in the early years of release a drug will trend very rapidly its trend in a subsequent year will be much lower than in the prior year until it reaches full adoption. Then the same is true in reverse when a drugs is being phased out. So simply repeating the same trend as the prior year yields very exaggerated estimates. To mitigate this the DIM uses a Growth Normalization Adjustment (GNA) that substitutes a lower trend in for a high trend - so for example all trends over 100% in the current year are replaced with 60% in the projected year. The GNA was based on looking at trends over time for drugs with outlier trends using the multiple years of data gathered from prior CDS-A surveys and validated based on published research. As discussed below actual 2019 experience was also used to evaluation 2018 assumptions based on this table. The GNA table is shown in table 2 below.

Table 2: Growth Normalization Adjustments

Absolute Value of Trend was	Projected Trend (same sign as prior trend)
0-10%	Prior Trend
10 to 20%	0%
20% to 50%	1%
50% to 100%	10%
100% +	60%
New in most recent year	100%

2020 Projections and Evaluation of Prior Projection

In 2018 the DIM projected inflation of 9.2% for the next period. That included 5.6% price inflation (Component B) and 3.6% driven by mix shits to more expensive drugs (Component C).

Component B: Drug Level Price Inflation

Actual 2018 to 2019 price inflation was -0.7% which reflects -0.5% actual experience net of a 0.2% benefit from shifting from ASP sites to 340B sites. As expected the benefits of shifting declined as the use of 340B pricing stabilized.

As the 2019 projection of 5.6% price inflation is a direct reflection of 2017 to 2018 experience the values can be averaged together to get a 2017 to 2019 average of 2.55%. This amount is in line with general inflation and supports the idea that drug price inflation is primarily driven the substitution of more expensive drugs rather than traditional price increases.

For next period the DIM model used 2.55% for drug level price inflation.

Component C: Mix Driven Price Inflation

Table 1 shows the predicted volume trends for 2019 and 2020 (grey shade) and the actual volume (unshaded) trends for 2018 and 2019. Pure volume reflects the average volume trend with no mix. This value is not included in the inflation factor as it is reimbursed on a retrospective basis but it is calculated as part of the modeling. Trends are calculated based on their impact on the total cost in dollar terms.

Table 1: Summary of Volume and Mix Trends as they Impact Total Dollars

	2018 Actual	Projected (based on 2017 to 2018)	2019 Actual	Projected (based on 2018 to 2019 actual)
Pure Volume	-12.5%	4.3%	8.1%	5.5%
Mix Driven	18.3%	3.9%	(-3.7%)	1.9%
Total Volume	3.5%	8.6%	4.2%	7.5%

The 2018 project in the DIM model included 3.9% for the impact of mix on pricing. This was derived from a total volume driven cost inflation increase of 8.6% of which approximately 4.3% was volume increases.

Actual experience varied considerably, the dollar impact of volume inflation was only 4.2% but that was driven by 8.1% volume increases and a -3.7% impact from price mix. Mix actually moved towards cheaper drugs with the largest impact coming from a decrease in the share of the highest cost drugs (>$200 per dose).

Therefore, the 2018 DIM model projection of pricing mix impact was overstated by almost 8% (3.9% versus -3.7%). Performance can also be evaluated at a drug level by comparing actual drug level volume change to projected change. Using this approach aggregates to a similar variation. The greatest variation is in the high costs drugs. The DIM model's projection of volume trend was relatively close (~3% error) but as the greater errors where in high cost drugs the dollar trend error is much larger. This likely reflects that these higher cost drugs are lower volume and newer and therefore more likely to drive unpredictable swings. The DIM model with the GNA was much more accurate than a simple carry forward of trends would have been and given actual 2017 to 2018 mix driven trend of 18.3% the predicted value of 3.9% seems reasonable.

Because the DIM model only includes trend for drugs already in use in the base periods it does not factor in any trend for brand new drugs in the projected period. Since these drugs are likely to be expensive, conceptually, this biases the projection down. However, for 2019 that was not the case (the model over-predicted trend). Because the CDS-A drug list changed significantly between 2018 and 2019 it is not possible to specifically evaluate the impact of new drugs. This analysis will be feasible for the next period as the drug list used will be more consistent.

For 2020 the DIM mode with the GNA predicts mix driven price trends of 1.9% which reflects a 7.5% overall volume driven cost trend less 5.5% that is pure volume. Given that 2018 to 2019 saw high volume trend and low mix trends it would be expected that the projections derived are more similar to this result. Although the model is clearly normalizing the trends in that it is not repeating a negative mix trend.

Given that we would expect the mix trend to bias low and that as recently as 2017 to 2018 there was significant mix trend it important not to overweight the most recent year. Using a blend of 2019 and 2020 predicted trend would yield a blend of 2.9% mix trend.

Summary

Combining a mix trend of 2.9% with a price trend of 2.55% yields a total trend of 5.5% ((1+.029)*(1+.0255)-1). Since this trend is to calculate rates for FY2021 an additional year is trend resulting in an effective proposed rate of 5.8%.