MILLIMAN RESEARCH REPORT

Reinsurance as a tool to mitigate risk in an alternative payment model

Modeling the impact of reinsurance on provider risk

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Robert Bachler, FSA, FCAS, MAAA
Nicholas Johnson, FSA, MAAA
Meredith Russell, ASA, MAAA
Pamela M. Pelizzari, MPH
L. Daniel Muldoon, MA

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Section 1: Introduction

Alternative payment models (APMs) are approaches to paying for medical services that tie payment to the quality or value of the care provided to patients as opposed to the quantity. They represent 'alternatives' to traditional fee-for-service reimbursement, which pays providers for each service rendered. Oncology APM concepts have been growing in popularity in recent years. Several factors are driving this popularity, including the high cost of treating oncology patients as well as the desire to better align incentives across stakeholders and encourage value for patients and purchasers. Discussion of how to structure APMs most effectively within oncology has occurred at a broad level, including between private payers and providers, among multi-stakeholder workgroups, and on a national stage due to the Oncology Care Model (OCM) of the Centers for Medicare and Medicaid Services (CMS), a voluntary national APM for oncologists that includes Medicare fee-for-service patients. Despite great progress in oncology APM development, providers have expressed concern that the degree of insurance risk may discourage broad APM adoption, but that better insight into the risk and tools to manage it will help oncology APMs to gain momentum.

Many APMs have built-in risk mitigation features such as outlier provisions or stop-loss limits. However, they may not offer adequate protection for small and midsize physician groups, which may be worried about even moderate swings in revenue from year to year. Variability in costs from year to year and low, potentially inaccurate target prices also contribute to the concerns.

The body of this report illustrates the impact of various types of reinsurance[1] on the risk posed to provider groups by oncology APMs similar in structure to the OCM. Both the risk inherent in an APM and the protection provided by reinsurance will vary based on the terms of the APM. To illustrate these differences in risk and protection, Appendix A includes tables that show the impact of reinsurance on a broader set of APM parameters.

It is important to note that the data underlying this report is based on Medicare's fee-for-service (FFS) payment structure. We would expect APMs based on commercial payment structures to exhibit more variation than is shown in this report because commercial payment rates may exhibit greater variation across providers than Medicare payment rates.

SUMMARY OF RESULTS

To demonstrate the risk a group might expect under a bundled payment methodology similar to OCM, we used actual Medicare oncology experience to generate 10,000 simulations (each one being the equivalent of a performance year) under this APM. This was done for several combinations of underlying parameters, such as physician group size and hospital affiliation, risk "track" (i.e., one-sided vs. two-sided risk with various stop-loss/gain limits), and the presence of bias in the target price. The table in Figure 1 shows the results for several of these parameter sets. For the parameter sets underlying Figure 1, we found a small physician group's episode spending is expected to exceed target prices by at least 5% more than 10% of the time. For large physician groups, the table shows only a 1% chance of spending exceeding targets by 5% or more. As noted in the table title ("No Target Bias"), these losses would occur even if the physician group were capable of achieving the overall medical cost[2] savings required by the APM calculation.[3]

[1] In most states, "reinsurance" purchased by physician groups is not reinsurance, but "stop-loss insurance." For purposes of this report, this technicality will be ignored and risk protection policies purchased by providers are referred to as "reinsurance."

[2] Throughout this paper, "medical cost" (or "FFS cost") is defined as claim cost from the perspective of a claims payer, whether an employer, an insurer, or CMS. It is not meant to reflect the direct cost incurred by medical providers to provide care.

[3] The assumption that required medical savings incorporated in the target rate calculation are a reasonable approximation of the expected achieved savings will be referred to throughout the report as the "unbiased" scenario.

FIGURE 1: APM RESULTS: TWO-SIDED RISK MODEL, WITHOUT REINSURANCE, NO TARGET BIAS

	Hospital Affiliated		Non-Hospital Affiliated	
Outcome Percentile	Small Practice	Large Practice	Small Practice	Large Practice
25th	3.9%	1.5%	4.0%	1.6%
50th	0.2%	0.0%	0.2%	0.1%
75th	(3.2%)	(1.4%)	(3.6%)	(1.5%)
90th	(6.4%)	(2.8%)	(6.7%)	(2.8%)
95th	(8.0%)	(3.6%)	(8.4%)	(3.6%)
97th	(9.1%)	(4.1%)	(9.6%)	(4.2%)
98th	(9.9%)	(4.6%)	(10.4%)	(4.6%)
99th	(11.0%)	(5.5%)	(11.8%)	(5.2%)
Average	0.4%	0.0%	0.3%	0.1%

Results are the gain / (loss) presented as a percentage of Medicare FFS costs incurred.

Based on these simulated outcomes, we estimated the cost and risk mitigation impact of three common types of reinsurance: specific, aggregating specific, and aggregate. The impact of reinsurance will vary based on the parameters of coverage purchased. For simplicity, we selected a single set of coverage parameters for each type of reinsurance. The table in Figure 2 shows the final results from the simulations underlying Figure 1, but adjusted for the impact of reinsurance. For example, this table suggests that the probability of significant losses for a small, non-hospital-based practice can be reduced substantially depending upon the type of reinsurance purchased. The net cost of this protection would vary by the type of reinsurance and with the parameters selected, but based on the parameters used in our analysis the net cost of reinsurance was 1% to 3% of episode spending.

FIGURE 2: APM RESULTS: TWO-SIDED RISK MODEL, WITH REINSURANCE

	Small Practice, By Reinsurance Type				Large Practice, By Reinsurance Type			
Outcome Percentile	None	Specific	Agg. Spec.	Aggregate	None	Specific	Agg. Spec.	Aggregate
25th	4.0%	(0.0%)	(0.8%)	2.4%	1.6%	(1.7%)	(1.5%)	1.6%
50th	0.2%	(2.8%)	(2.5%)	(1.3%)	0.1%	(2.9%)	(2.1%)	0.0%
75th	(3.6%)	(5.6%)	(4.0%)	(4.9%)	(1.5%)	(4.0%)	(2.7%)	(1.5%)
90th	(6.7%)	(8.0%)	(5.2%)	(6.1%)	(2.8%)	(5.0%)	(3.3%)	(2.8%)
95th	(8.4%)	(9.3%)	(5.9%)	(6.2%)	(3.6%)	(5.5%)	(3.6%)	(3.7%)
97th	(9.6%)	(10.2%)	(6.4%)	(6.2%)	(4.2%)	(5.9%)	(3.7%)	(4.2%)
98th	(10.4%)	(10.6%)	(6.7%)	(6.3%)	(4.6%)	(6.2%)	(3.9%)	(4.6%)
99th	(11.8%)	(11.6%)	(7.2%)	(6.3%)	(5.2%)	(6.6%)	(4.1%)	(4.8%)
Average	0.3%	(2.7%)	(2.2%)	(0.6%)	0.1%	(2.8%)	(2.1%)	0.1%

Results are the gain / (loss) presented as a percentage of Medicare FFS costs incurred. This table reflects the non-hospital-affiliated scenario.

While Figures 1 and 2 above illustrate results from a specific set of underlying contract parameters similar to the OCM, we believe our complete analysis shows that if an APM as a standalone payment mechanism carries more risk than a physician group wishes to accept, appropriate forms of reinsurance can offer significant protection. This protection does come at a cost. However, if the physician group is willing to accept that cost, a bundled payment that creates otherwise unacceptable risk can become a viable concept for more groups.

Appendix A includes similar results from 48 different APM scenarios. These scenarios are described in more detail in the body of the report.

Key takeaways from this report include

- In the absence of any reinsurance, large physician groups will tend to experience smaller losses as a percentage of total episode spending in poor performing years than smaller practices.
- Aggregate coverage will provide more dependable coverage against the highest possible losses given that, by definition, it limits total losses.
- Specific coverage alone does not provide the desired protection against large overall losses, especially when the APM methodology incorporates winsorization[4].
- Aggregating specific coverage can be more effective than specific coverage in limiting the loss at the highest percentile outcomes to a lower cost, especially for small practices.
- Aggregate reinsurance can provide protection against significant losses even when target rates are understated. The same is not true for specific or aggregating specific coverage.
- Reinsurance coverage can offer risk protection in the event of a loss. However, this protection comes at a cost that often reduces gains in good performing years.
- Groups that are only concerned with mitigating losses may prefer an aggregate policy, which provides no reimbursements in "good" years, but offers a reduced cost of reinsurance as a result.
- No type of reinsurance will completely prevent understated target rates from reducing expected gains (or increasing expected losses) to providers.

CAVEATS AND LIMITATIONS

This report was commissioned by Amgen. The findings reflect the research of the authors; Milliman does not intend to endorse any product or organization. If this report is reproduced, we ask that it be reproduced in its entirety, as pieces taken out of context can be misleading.

The model was developed based on our experience in working with APMs and reinsurance. Actual experience will vary from our models for many reasons, including differences in population health status, medical and prescription drug reimbursement levels, and the delivery of healthcare and prescription drug services, as well as other nonrandom and random factors.

The model as provided was intended to provide illustrations of potential reinsurance coverages for the purpose of understanding the costs and benefits of these coverages. There have been simplifying assumptions made that result in a model with less precision than might be desirable for either purchasers or providers of reinsurance coverage. These are described in the section "OCM Assumptions."

In performing our analysis, we relied on data and OCM program information provided by CMS. We have not audited or verified this data and other information. If the underlying data or information is inaccurate or incomplete, the results of our analysis may likewise be inaccurate or incomplete. These results are based on our analysis of the 2014-2017 100% Medicare Research Identifiable File (RIF) claims files and the CMS OCM specifications. Any analysis using different data sets, inputs, time periods, and methodology will produce different results.

Rob Bachler, Nick Johnson, and Meredith Russell are consulting actuaries at Milliman and are members of the American Academy of Actuaries and meet its qualification standards to render this analysis.

[4] "Winsorization" applies a limit to extreme values. For example, winsorization at $100,000 would mean all values exceeding $100,000 would be treated as though they were exactly $100,000.

Section 2: OCM program

ONCOLOGY CARE MODEL BACKGROUND

The Oncology Care Model (OCM) program of the Centers for Medicare and Medicaid Services (CMS) is a specialty care episode payment model that aims to "provide higher quality, more highly coordinated oncology care at the same or lower cost to Medicare."[5] OCM is a voluntary model that runs from 2016 to 2021, with 176 practices and 11 non-Medicare payers participating as of February 2019.[6] CMS estimates that OCM includes approximately 25% of Medicare fee-for-service (FFS) chemotherapy-related cancer care—more than 150,000 unique beneficiaries and more than 200,000 episodes each year.[7] Given the size of OCM and Medicare's status as the largest payer of cancer care in the United States,[8] OCM may influence oncology value-based arrangements that other payers adopt.

OCM episodes begin with outpatient chemotherapy administered through Medicare Part B or Part D and last for six months or until death. Beneficiaries who receive chemotherapy for longer than six months are eligible to initiate multiple episodes. OCM episodes include all Part A and Part B expenditures, and certain Part D expenditures—low-income subsidy (LIS) cost-sharing amounts and 80% of the gross drug cost above the catastrophic threshold.[9]

OCM includes a two-part payment methodology to support model goals:

- A care management payment, set at $160 per OCM beneficiary per month, called the monthly enhanced oncology services (MEOS) payment
- A retrospective performance-based payment that compares actual episode spending, inclusive of MEOS payments, against a discounted spending target (CMS retains the discount as savings)

CMS calculates spending targets from historical expenditures that are trended to each OCM performance period and incorporates risk adjustment factors such as:[10]

- Beneficiary demographics (e.g., age and gender)
- Cancer type (e.g., breast, prostate, lung)
- Provision of certain services (e.g., radiation)
- Comorbidities
- Part D LIS status
- Historical practice experience
- Adjustment for use of novel therapies

To receive a performance-based payment, a practice must exceed a minimum quality threshold and keep spending below the discounted target. All else equal, practices that achieve higher quality scores will receive higher performance-based payments.[11]

CMS allows practices to select one of three potential risk tracks, including a one-sided risk track, an original two-sided risk track, and a recently announced alternative two-sided risk track. Under the one-sided risk track, CMS applies a 4% discount to the reconciliation calculation, but practices are not required to repay CMS if actual spending exceeds the discounted spending target. Under the original two-sided risk track, CMS applies a 2.75% discount to the reconciliation calculation, and practices are required to repay CMS if actual spending exceeds the discounted spending target. Under the one-sided and the original two-sided risk tracks, performance-based payments can be up

[5] CMS. Oncology Care Model. Retrieved March 6, 2019, from https://innovation.cms.gov/initiatives/oncology-care/.
[6] CMS (February 2019). Oncology Care Model Overview. Retrieved March 6, 2019, from https://innovation.cms.gov/files/slides/ocm-overview-slides.pdf.
[7] CMS, Oncology Care Model Overview, ibid.
[8] American Cancer Society Cancer Action Network. The Costs of Cancer: Addressing Patient Costs. Retrieved March 6, 2019, from https://www.fightcancer.org/sites/default/files/Costs%20of%20Cancer%20-%20Final%20Web.pdf.
[9] CMS, Oncology Care Model Overview, op cit.
[10] CMS (December 17, 2018). OCM Performance-Based Payment Methodology. Retrieved March 6, 2019, from https://innovation.cms.gov/Files/x/ocm-pp3beyond-pymmeth.pdf.
[11] CMS, OCM Performance-Based Payment Methodology, ibid.

to 100% of the FFS cost savings in excess of the applied discount, capped at 20% of the undiscounted spending target. Under the original two-sided risk track, repayments to CMS are capped at 20% of the undiscounted spending target.[12]

In late 2018, CMS announced the alternative two-sided risk track for OCM including the following modifications relative to the original two-sided risk track:[13]

- CMS applies a 2.5% discount, rather than 2.75%, when calculating spending targets
- Practices are not required to pay back CMS unless actual spending exceeds the undiscounted spending target, rather than the discounted spending target
- Performance-based payment and repayment are capped based on the sum of annual practice revenue and Part B chemotherapy furnished by other practices to beneficiaries in OCM episodes
  - Performance-based payments are capped at 16%
  - Repayments are capped at 8%

While practices can elect one-sided risk for the duration of OCM, CMS requires that practices achieve at least one performance-based payment by mid-2019 (the fourth OCM reconciliation) to remain in one-sided risk.[14] Lastly, practices that elect one of the two-sided risk tracks may be treated as Qualified Participants in an Advanced Alternative Payment Model and receive a bonus payment of 5% of Medicare FFS Part B payments (excluding drugs).[15] As of February 2019, the vast majority of practices remain in the one-sided risk track.

[12] CMS, Oncology Care Model Overview, op cit.
[13] CMS, Oncology Care Model Overview, ibid.
[14] CMS, Oncology Care Model Overview, ibid.
[15] CMS. Quality Payment Program. Advanced Alternative Payment Models. Retrieved March 6, 2019, from https://qpp.cms.gov/apms/advanced-apms.

Section 3: Bundled payments risk profile

SHARED SAVINGS

The least risky form of APMs for providers, in which they are not subject to losses, can be referred to using several terms: shared savings, upside-only, or one-sided risk. The crux of this financial arrangement is that the provider is guaranteed a minimum payment equal to current reimbursement levels but has the opportunity to receive higher reimbursement if they achieve certain quantifiable objectives. Under our simplified OCM example, the minimum reimbursement would be Medicare fee-for-service (FFS) payments. On top of this floor reimbursement, groups are eligible for additional bonuses if they achieve savings targets. The table in Figure 3 shows our simulated gain distribution, relative to Medicare FFS payments, by outcome percentile.[16] This table is based on our "unbiased" scenario (i.e., the calculated episode target prices accurately reflect the savings the physician group can achieve).

There are no losses reflected in Figure 3 because there is no loss potential under a one-sided risk arrangement.

FIGURE 3: APM RESULTS: ONE-SIDED RISK MODEL

	Hospital Affiliated		Non-Hospital Affiliated	
Outcome Percentile	Small Practice	Large Practice	Small Practice	Large Practice
25th	4.9%	2.0%	5.1%	2.1%
50th	2.3%	1.0%	2.4%	1.0%
75th	0.2%	0.1%	0.1%	0.0%
90th	0.0%	0.0%	0.0%	0.0%
95th	0.0%	0.0%	0.0%	0.0%
97th	0.0%	0.0%	0.0%	0.0%
98th	0.0%	0.0%	0.0%	0.0%
99th	0.0%	0.0%	0.0%	0.0%
Average	3.1%	1.3%	3.3%	1.3%

Results are the gain / (loss) presented as a percentage of Medicare FFS costs incurred.

SHARED RISK

Arrangements where providers are subject to losses are also referred to using several terms: shared risk, full risk, two-sided risk. Under the purest form of these arrangements, providers are subject to unlimited losses if FFS costs are extremely high, while also having the potential to reap large rewards if FFS costs are substantially less than expected. In practice, these risk arrangements typically have features that limit both the losses and gains that may result. The table in Figure 4 shows our simulated gain distribution, relative to Medicare FFS payments, by outcome percentile for a two-sided risk arrangement under the unbiased scenario with risk mitigation factors similar to those found in the OCM program (and described below).

[16] The X^{th} percentile represents the gain a given physician group will exceed X% of the time. Alternatively, the group will have losses greater than the X^{th} percentile (100 - -X)% of the time. For example, according to Figure 3, a small non-hospital-affiliated practice would achieve a gain of 5.1% or more 25% of the time. This is not necessarily equivalent to saying that a particular physician group is in the X^{th} percentile of all physicians, although the two may be correlated with one another.

Unlike Figure 3, the table in Figure 4 shows the potential for losses.

FIGURE 4: APM RESULTS: TWO-SIDED RISK MODEL

	Hospital Affiliated		Non-Hospital Affiliated	
Outcome Percentile	Small Practice	Large Practice	Small Practice	Large Practice
25th	3.9%	1.5%	4.0%	1.6%
50th	0.2%	0.0%	0.2%	0.1%
75th	(3.2%)	(1.4%)	(3.6%)	(1.5%)
90th	(6.4%)	(2.8%)	(6.7%)	(2.8%)
95th	(8.0%)	(3.6%)	(8.4%)	(3.6%)
97th	(9.1%)	(4.1%)	(9.6%)	(4.2%)
98th	(9.9%)	(4.6%)	(10.4%)	(4.6%)
99th	(11.0%)	(5.5%)	(11.8%)	(5.2%)
Average	0.4%	0.0%	0.3%	0.1%

Results are the gain / (loss) presented as a percentage of Medicare FFS costs incurred.

BUILT-IN RISK MITIGATION

In recognition of the risks posed by bundled payments, APMs will often have certain design features that reduce volatility in payments, while preserving the group's incentives to manage the FFS cost of episodes. Two of these features, both of which are found in the OCM program and our simplified version, are described below.

Winsorization

The first line of defense against risk found in the two-sided OCM is the outlier provision called "winsorization." When an episode's FFS costs exceed the 95th percentile cost level (i.e., is greater than 95% of similar episodes nationally), the episode's costs are replaced with the 95th percentile cost in settlement calculations. Similarly, OCM episodes costing less than the 5th percentile cost nationally are treated as though their costs were equal to the 5th percentile cost. This prevents a single high-cost episode from driving the group's overall results. While mitigating the risk of the highest-cost episodes, this provision provides only a limited amount of protection because for many episode types even a "95th percentile" episode can significantly impact a physician group's results. The table in Figure 5 shows our simulated outcome distribution for non-hospital-affiliated physician groups with and without winsorization. This shows that winsorization reduces the variability in outcomes for both small and large practices. It does not have a meaningful impact on the overall expected gain/loss (shown in the "Average" row of the table), as the decreased losses in "bad" years come at the price of reduced gains in "good" years.

FIGURE 5: APM RESULTS: TWO-SIDED RISK MODEL, WINSORIZATION

	Small Practice		Large Practice	
Outcome Percentile	Without Winsorization	With Winsorization	Without Winsorization	With Winsorization
25th	4.0%	3.4%	1.6%	1.3%
50th	0.2%	0.0%	0.1%	(0.0%)
75th	(3.6%)	(3.1%)	(1.5%)	(1.3%)
90th	(6.7%)	(5.7%)	(2.8%)	(2.5%)
95th	(8.4%)	(7.2%)	(3.6%)	(3.1%)
97th	(9.6%)	(8.2%)	(4.2%)	(3.4%)
98th	(10.4%)	(8.8%)	(4.6%)	(3.7%)
99th	(11.8%)	(9.8%)	(5.2%)	(4.3%)
Average	0.3%	0.2%	0.1%	0.0%

Results are the gain / (loss) presented as a percentage of Medicare FFS costs incurred. This table reflects the non-hospital-affiliated scenario.

Gain/loss limits

If a group experiences more than a few high-cost episodes or faces inadequate target payments overall, the outlier provisions will not provide sufficient risk mitigation. As a result, CMS included a gain/loss limit provision to limit groups' risk exposure. In a "bad" year, losses due to the OCM reconciliation are limited to 20% of the target payment. Conversely, gains in a "good" year are capped at 20% of the target as an offset.

TARGET PRICE RISK

In addition to the risk of random variation in the FFS cost of individual episodes, providers under a bundled payment APM also bear the risk associated with the setting of the bundled payment amount, often referred to as the target price. In the event the target prices are less than the true expected FFS cost of each episode, the group's episode costs are more likely to exceed the target. This may occur due to errors in calculating the original benchmarks used to calculate the (potentially discounted) target price. However, it can also occur in the OCM and likely any similar programs where target price calculations include a discount from the expected FFS cost and a physician group is not able to achieve the assumed level of savings through medical management. In the table in Figure 6, we present a comparison of results for non-hospital-affiliated physician groups under three different pricing scenarios and two-sided risk.

1. **Unbiased, accurate**: The target price is always equal to the average FFS cost of the respective episode. There is no mispricing risk. These columns are identical to the "with winsorization" columns in Figure 5.
2. **Unbiased, inaccurate**: When aggregated across all episode types, target prices are unbiased. Target prices for individual episode types are inaccurate up to +/-8% of the true expected FFS cost by episode type.
3. **Biased, inaccurate:** The target price is understated on average, with additional variation of up to +/-8% of the true expected FFS cost by episode type. For our analysis, we assumed an average understatement of 2.75% for two-sided risk scenarios.

FIGURE 6: APM RESULTS: TWO-SIDED RISK MODEL, MISPRICING RISK SCENARIOS

	Small Practice, By Pricing Error			Large Practice, By Pricing Error		
Outcome Percentile	Unbiased, Accurate	Unbiased, Inaccurate	Biased, Inaccurate	Unbiased, Accurate	Unbiased, Inaccurate	Biased, Inaccurate
25th	3.4%	3.5%	0.5%	1.3%	1.5%	(1.2%)
50th	0.0%	(0.0%)	(2.7%)	(0.0%)	0.0%	(2.6%)
75th	(3.1%)	(3.2%)	(5.7%)	(1.3%)	(1.4%)	(4.1%)
90th	(5.7%)	(5.8%)	(8.3%)	(2.5%)	(2.7%)	(5.3%)
95th	(7.2%)	(7.4%)	(9.8%)	(3.1%)	(3.5%)	(6.1%)
97th	(8.2%)	(8.4%)	(10.6%)	(3.4%)	(4.0%)	(6.6%)
98th	(8.8%)	(9.1%)	(11.2%)	(3.7%)	(4.3%)	(6.9%)
99th	(9.8%)	(10.4%)	(12.2%)	(4.3%)	(5.0%)	(7.3%)
Average	0.2%	0.3%	(2.5%)	0.0%	0.1%	(2.6%)

Results are the gain / (loss) presented as a percentage of Medicare FFS costs incurred. This table reflects the non-hospital-affiliated scenario and includes the effect of winsorization.

Figure 6 shows that, although inaccuracies in target prices for individual episode types increase the variability of results, they do not have a negative impact on expected results as long as they are not systematically understated. This is seen by comparing the "unbiased, inaccurate" (i.e., no systematic understatement) and "biased, inaccurate" (i.e., with a systematic understatement) columns with the "unbiased, accurate" column.

PRACTICE SIZE

The results in Figure 6 also demonstrate the difference in the variability of outcomes between small and large practices, defined for our purposes as practices that accrue 250 and 1,500 episodes on an annual basis, respectively.

Not surprisingly, the large practices face less variation. This difference in variation is strictly due to the statistical phenomenon known as “the law of large numbers”, as we are not reflecting any inherent differences in clinical or operational practice that might exist between practices of different size. Overall average gains and losses for both practice sizes can be significantly impacted by biased target prices.

Section 4: Reinsurance overview

This section will briefly describe three potential forms of reinsurance coverage: specific, aggregate, and a less common version known as aggregating specific.

SPECIFIC REINSURANCE

The most common type of reinsurance coverage purchased by risk-taking providers is "specific" or "individual" reinsurance. Specific reinsurance policies are triggered when an individual member's FFS costs (or an episode's FFS costs, for a bundled payment), exceed the attachment point, also referred to as the specific deductible. The reinsurer then reimburses all or a portion of the costs above the deductible. This type of reinsurance is considered the most insurable and easily underwritten risk from the reinsurer's perspective and is most effective when the principal risk is "shock" losses from very large claimants. It is less effective in mitigating mispricing risk.

See the table in Figure 7 for an example calculation of specific reinsurance.

FIGURE 7: SPECIFIC REINSURANCE EXAMPLE

EPISODE	FFS COST	SPECIFIC DEDUCTIBLE	REINSURANCE REIMBURSEMENT
A	$50,000	$25,000	$25,000
B	$10,000	$25,000	$0
C	$100,000	$25,000	$75,000
D	$5,000	$25,000	$0
Total	$165,000		$100,000

AGGREGATING SPECIFIC REINSURANCE

Aggregating specific reinsurance starts with a specific reinsurance policy but also includes a second layer, the aggregating specific deductible (ASD). After calculating the amount exceeding the specific deductible for each individual member (or episode), the amounts above the deductible are summed. This sum is then compared to the ASD. If the sum exceeds the ASD, the reinsurer reimburses the excess. The ASD may be used to reduce the likelihood of reimbursement and therefore the reinsurance premium, especially for large groups or for policies with relatively low deductibles. While it provides a level of protection against individual shock losses, it can also protect the provider against an unusually large number of expensive, but not catastrophically high, members or episodes.

See the table in Figure 8 for an example calculation of aggregating specific reinsurance.

FIGURE 8: AGGREGATING SPECIFIC REINSURANCE EXAMPLE

EPISODE	FFS COST	SPECIFIC DEDUCTIBLE	PRE-ASD REINSURANCE REIMBURSEMENT
A	$50,000	$25,000	$25,000
B	$10,000	$25,000	$0
C	$100,000	$25,000	$75,000
D	$5,000	$25,000	$0
Total – Pre-ASD	$165,000		$100,000
Aggregating Specific Deductible		$75,000	$25,000

The $100,000 in total specific reimbursement is compared to the ASD of $75,000: The excess amount is $25,000, which is the final reimbursement.

AGGREGATE ONLY REINSURANCE

Aggregate reinsurance reimburses groups when the total medical costs for the group exceed a certain threshold, usually defined as a proportion of expected medical costs and referred to as the aggregate corridor. While aggregate reinsurance more directly addresses a group's overall risk, it can be considered a less insurable risk, requires more careful and sophisticated underwriting, and can result in volatile loss ratios for the reinsurer. For these reasons, it may not be as widely available to providers as specific reinsurance coverage. However, it can be a very effective means of mitigating risk at a lower overall cost than specific coverage.

See the table in Figure 9 for an example calculation of aggregate reinsurance.

FIGURE 9: AGGREGATE STOP-LOSS EXAMPLE

EPISODE	FFS COST	TARGET
A	$50,000	$25,000
B	$10,000	$25,000
C	$100,000	$25,000
D	$5,000	$25,000
Total	$165,000	$100,000
Aggregate Corridor		105% of Target ($105,000)
Reimbursement		$60,000

The $165,000 in total episode FFS costs is compared to the attachment point of $105,000: The excess amount is $60,000, which is the final reimbursement.

Note that the three types of reinsurance have been presented in order of least to most volatile from the reinsurer's perspective. Accordingly, the risk margin demanded by reinsurers typically follows the same pattern, with specific coverage premiums including a lower margin rate[17] than ASD coverage, and aggregate-only coverage including the highest margin rate.

KEY ISSUES FOR MEDICAL PROVIDERS AND REINSURERS

Traditional purchasers of reinsurance include insurance companies and health plans, but as alternative payment models (APMs) become more prevalent, the number and diversity of entities taking on healthcare risk is growing. Because these entities can be smaller (i.e., potentially subject to more random variation in costs) and less tolerant of risk, they are a prime market for reinsurance. However, reinsurance policies for non-insurers must account for the differences between traditional purchasers and these newer risk takers.

Generally the reinsurer will underwrite risk only where the purchaser has significant downside potential. For example, in the "shared savings" model in the OCM program, the physician group has only upside potential and can receive no less than Medicare FFS for services provided. A reinsurer is less likely to reinsure such an arrangement, because the group does not have the threat of losses to provide incentive for containing FFS costs.

A reinsurer will generally design the reinsurance contract to avoid reimbursing the provider for FFS costs that the provider is not otherwise responsible for. As an example, a reinsurer is unlikely to set a specific deductible higher than an outlier truncation, or winsorization, point embedded within the APM because the group is not at risk for FFS costs above that point. Similarly, on aggregate coverage, a reinsurer would not reimburse FFS costs above any built-in risk protection such as a stop-loss limit that is part of the APM.

Finally, because medical providers presumably have more control over FFS costs than traditional reinsurance purchasers, reinsurers may place additional limitations within the policy. Two fairly common limitations are assumptions of cost/reimbursement levels below typical payer reimbursement and imposition of a coinsurance whereby the provider is still responsible for a share of losses above the reinsurance deductible.

[17] Defined as (100% – *expected reimbursements as a percentage of premium*).

Section 5: Risk mitigation through reinsurance

This section illustrates the variability of results that a provider might expect under an APM as well as the impact different types of reinsurance can have on that variability. The results of our analysis also show how different characteristics of the physician group or the APM structure can affect both outcome variability and the effectiveness of reinsurance.

Please see Section 6 below for assumptions and methodology used in the APM modeling.

It is important to note that although OCM reconciliations are performed on a semiannual basis, we expect reinsurance carriers would most likely write coverage on an annual basis. Therefore, we modeled the reinsurance contracts and physician group gains/losses on an annual basis.

The attachment points of the various reinsurance types have been set as follows:

- Specific
  - Attachment point for each cancer type is two times the target price
- Aggregating specific
  - Specific attachment point for each cancer type is equal to the target price
  - Aggregating specific deductible is 25% of the summed target price for all episodes
- Aggregate
  - Aggregate attachment point is 105% of the sum of target price for all episodes

We have assumed specific or aggregating specific policies are constructed so that episodes costing more than the attachment point will be paid out even in "good" years where the group receives a performance-based payment (PBP) from CMS. This design feature not only provides a form of protection against losses, but also protects a group's gains against outlier episodes. Groups that are only concerned with mitigating losses may prefer an aggregate policy, which provides no reimbursements in "good" years, but offers a reduced cost of reinsurance as a result.

RESULTS

In the table in Figure 10, the distribution of loss outcomes is shown without reinsurance coverage and in the presence of each reinsurance type when we assume unbiased, but inaccurate, target rates[18] and winsorization consistent with the OCM program. Gains and losses are presented as a proportion of FFS Medicare episode costs. The calculation of gains and losses is limited to bundled payment episode spending. To the extent that the physician group sees non-Medicare patients, the payment base will be larger than shown and the risk of a Medicare-only program as a percentage of episode spending will be lower than shown.

Note that, in Figures 10 and 11, the gain/loss results for the reinsurance scenarios reflect an offset for the cost of the reinsurance premium. Therefore, in some cases, results in the presence of reinsurance are actually worse than the "no reinsurance" scenario.

[18] See Section 3 for description.

FIGURE 10: APM RESULTS: TWO-SIDED RISK MODEL, IMPACT OF REINSURANCE

	SMALL PRACTICE, BY REINSURANCE TYPE				LARGE PRACTICE, BY REINSURANCE TYPE			
OUTCOME PERCENTILE	NONE	SPECIFIC	AGG. SPEC.	AGGREGATE	NONE	SPECIFIC	AGG. SPEC.	AGGREGATE
25th	3.5%	1.1%	(0.1%)	2.3%	1.5%	(0.6%)	(0.8%)	1.5%
50th	(0.0%)	(2.0%)	(1.8%)	(1.1%)	0.0%	(1.9%)	(1.4%)	0.0%
75th	(3.2%)	(4.6%)	(3.2%)	(4.2%)	(1.4%)	(3.1%)	(2.1%)	(1.5%)
90th	(5.8%)	(7.0%)	(4.4%)	(5.4%)	(2.7%)	(4.2%)	(2.6%)	(2.8%)
95th	(7.4%)	(8.3%)	(5.1%)	(5.5%)	(3.5%)	(4.8%)	(2.9%)	(3.5%)
97th	(8.4%)	(9.3%)	(5.6%)	(5.6%)	(4.0%)	(5.3%)	(3.1%)	(4.0%)
98th	(9.1%)	(9.9%)	(5.9%)	(5.6%)	(4.3%)	(5.6%)	(3.3%)	(4.4%)
99th	(10.4%)	(10.8%)	(6.4%)	(5.7%)	(5.0%)	(6.1%)	(3.5%)	(4.5%)
Average	0.3%	(1.7%)	(1.5%)	(0.4%)	0.1%	(1.9%)	(1.4%)	0.0%

Results are the gain / (loss) presented as a percentage of Medicare FFS costs incurred. This table reflects the non-hospital-affiliated scenario, includes the effect of winsorization, and reflects unbiased, inaccurate target payments.

While exact results will differ based on the characteristics of the covered APM and the terms of the reinsurance coverage, Figure 10 leads to conclusions that we expect would be generally true with an episode-based APM with characteristics similar to OCM.

- In the absence of any reinsurance, large physician groups will tend to experience smaller losses as a percentage of total episode spending in "bad" years than smaller practices.
- Aggregate coverage will provide more dependable coverage against the highest possible losses given that, by definition, it limits total losses.
- Specific coverage alone does not provide the desired protection against large overall losses. This is likely due, in part, to the presence of winsorization within the OCM parameters underlying Figure 10.
- The aggregating specific coverage is more effective than specific coverage in limiting the loss at the highest percentile outcomes, especially for small practices.
- Due to lower volumes of episodes, small practices generally experience more volatility than large practices. This makes an aggregate reinsurance payout more likely, resulting in a higher net cost of reinsurance coverage for small groups.
- While some of the coverage options offer risk protection in the event of a loss, this protection comes at a cost that reduces potential gains. For example, in Figure 10, the 25th percentile outcome for a small practice is a gain of 3% in the absence of reinsurance. Reinsurance premiums would cut this gain down between 0% and 2%, depending on the type of reinsurance coverage selected.

The table in Figure 11 is similar to Figure 10, but shows results under the assumption that target rates are biased, or understated, by 2.75%.

FIGURE 11: IMPACT OF REINSURANCE ON RISK

	SMALL PRACTICE, BY REINSURANCE TYPE				LARGE PRACTICE, BY REINSURANCE TYPE			
OUTCOME PERCENTILE	NONE	SPECIFIC	AGG. SPEC.	AGGREGATE	NONE	SPECIFIC	AGG. SPEC.	AGGREGATE
25th	0.5%	(2.1%)	(3.6%)	(2.4%)	(1.2%)	(3.5%)	(4.2%)	(1.7%)
50th	(2.7%)	(4.8%)	(5.1%)	(5.4%)	(2.6%)	(4.7%)	(4.8%)	(3.2%)
75th	(5.7%)	(7.4%)	(6.4%)	(6.9%)	(4.1%)	(5.9%)	(5.4%)	(4.6%)
90th	(8.3%)	(9.6%)	(7.5%)	(7.2%)	(5.3%)	(6.9%)	(5.9%)	(5.0%)
95th	(9.8%)	(10.8%)	(8.1%)	(7.4%)	(6.1%)	(7.6%)	(6.2%)	(5.1%)
97th	(10.6%)	(11.6%)	(8.5%)	(7.5%)	(6.6%)	(8.0%)	(6.4%)	(5.1%)
98th	(11.2%)	(12.1%)	(8.8%)	(7.5%)	(6.9%)	(8.2%)	(6.5%)	(5.1%)
99th	(12.2%)	(12.9%)	(9.2%)	(7.6%)	(7.3%)	(8.6%)	(6.8%)	(5.1%)
Average	(2.5%)	(4.7%)	(4.9%)	(4.2%)	(2.6%)	(4.7%)	(4.8%)	(2.9%)

Results are the gain / (loss) presented as a percentage of Medicare FFS costs incurred. This table reflects the non-hospital-affiliated scenario, includes the effect of winsorization, and reflects biased, inaccurate target payments.

Comparing Figure 11 to Figure 10 provides insight into what different types of reinsurance can and cannot do.

- Aggregate reinsurance provides the same protection against significant losses even when target rates are understated. The same is not true for specific or aggregating specific coverage.
    - This illustrates a key reason that reinsurers require more data and a higher margin to underwrite aggregate coverage. With aggregate coverage, the reinsurer is taking on the risk of inaccurate target prices.
    - This observation assumes the aggregate attachment points are set using target rates as a foundation. Reinsurers may set the attachment point using different values as the basis.
- No type of reinsurance will completely prevent understated target rates from reducing expected gains (or increasing expected losses) to providers.

Section 6: Data and methodology

MEDICARE RESEARCH IDENTIFIABLE FILE

The 100% Medicare RIF claims files contain all Medicare paid FFS claims generated for all Medicare FFS beneficiaries. Information in the claims files includes diagnosis codes, procedure codes, diagnosis-related group (DRG) codes, site of service information, and beneficiary information, including age, eligibility status, and an indicator for Medicare Advantage enrollment.

CMS OCM documentation

- OCM Initiating Cancer Therapies and Codes (OCM Initiating Cancer Therapies and Codes Effective 01.02.2018_v1.4_20180416.xlsx)
- OCM Cancer Type Mapping and Codes, which includes both ICD-9 and ICD-10 mapping (OCM Cancer Type Mapping and Codes Effective 07.02.17_20170501.xlsx)
- OCM Performance-Based Payment Methodology (OCM PBP Methodology Effective 07.02.2017_v5.1_20190103.pdf)
- OCM Prediction Model Code Lists (OCM Prediction Model Code Lists Effective 07.02.2017_20171227.xlsx)

SUMMARY OF EPISODES

Constructing episodes

1. We identified all Part B and Part D index chemotherapy claims (ICCs) for Medicare fee-for-service beneficiaries nationally between January 1, 2014, and June 30, 2017.
2. We defined an ICC as a Part B or Part D chemotherapy claim that did not occur within six months of another potential ICC (See Appendix B).
    a. Beneficiaries must have been enrolled in Medicare FFS Parts A and B and not have been receiving eligibility through the end-stage renal disease (ESRD) benefit for six months following the potential index claim (or until death).
    b. Beneficiaries must also have had at least one professional evaluation and management (E&M) claim with a cancer diagnosis code in the six months following the ICC.
3. We flagged Part B ICCs for the presence of a cancer diagnosis code used in OCM (see Appendix C). Because Part D claims do not have diagnosis codes, Part D ICCs must have had professional or hospital outpatient claims with cancer diagnoses in the 59 days before or on the service date. We did not impose this requirement to Part D ICCs with service dates before March 1, 2014, because we do not have access to 2013 claims.
4. We then constructed episodes for each qualifying ICC using all available claims incurred in the six months including and following the ICC.
    a. For Part A and B claims, we calculated episode spending from paid amounts on claims. For Part D claims, we calculated episode spending from 80% of the gross drug cost above the catastrophic threshold and low-income subsidies (these are the Part D spending components that CMS includes in OCM episode spending).
5. We trended episode spending amounts for 2014, 2015, and 2016 episodes to 2017 dollars by cancer types. We grouped all episodes with non-reconciliation-eligible cancer types together when trending.
6. After trending to 2017 dollars, we normalized episode spending within each hospital referral region (HRR) by cancer type. This was based on the ratio of average episode spending for each cancer type within an HRR to the national average episode spending for each cancer type. We grouped all episodes with non-reconciliation-eligible cancer types together when normalizing spending.

Assigning cancer types

Following OCM, we assigned a cancer type to each episode based on the plurality of cancer diagnosis codes on professional E&M claims that occur during each six-month episode. In the event of a tie, we applied the OCM tiebreaker logic by assigning the cancer type associated with:

1. The most recent visit in the episode
2. The cancer type that is reconciliation-eligible
3. The lowest last digit of the Taxpayer Identification Number (TIN)

See Appendices D and E for the cancer diagnosis codes. Additionally, we stratified bladder, breast, and prostate cancer episodes into high- and low-risk (low- and high-intensity for prostate, per CMS terminology) strata, based on drugs used in the episodes. See Appendices F, G, and H for the specific drugs used for this exercise.

"OCM" ASSUMPTIONS

While we are using the OCM as a guide for the chemotherapy bundled program modeled in the analysis, we have not exactly adhered to its terms or structure, in order to simplify the analysis and make the results more universal for other chemotherapy bundled payments. Listed below are the key features of the bundled payments modeled:

- Winsorization of individual episode FFS costs at 5th and 95th percentiles.
- Both gains and losses are capped at 20% of the target.
- A benchmark discount of 2.75% (for two-sided risk) and 4.00% (for one-sided risk).
- Semiannual reconciliation of the PBP

The components of the OCM program we have disregarded include but are not limited to the novel therapies adjustment, the performance multiplier, the experience adjuster, and the MEOS payment.

Although OCM includes LIS status as a component of its target rate setting, this factor was not deemed separately important for our reinsurance modeling.

SIMULATION OF POTENTIAL OUTCOMES

To model the risk facing physician groups under the APM, we built a simulation model to randomly generate outcome "years." The model develops approximate APM payments and reinsurance payouts in seven key steps, which are described below.

Step 1: Calculate implied benchmark prices

For the purpose of this analysis, we assumed the "correct" benchmark price for a particular episode type was the average cost of all episodes of that type found in our data. This benchmark price was later used in the development of the assumed target price per episode, with adjustments dependent upon the scenario being tested.

Step 2: Randomly generate target prices and episode counts

The overall episode count mean varies by practice size and the overall distribution by cancer type and setting is assumed to be consistent with the nationwide average from the 100% Medicare RIF data. For each iteration of the simulation, we generate random numbers from Poisson distributions developed using the nationwide average distribution of cancer types and settings to simulate the episode counts for each cancer type and setting.

For the scenarios where target prices vary from the calculated benchmark, we applied the following adjustments

- For scenarios where the target prices were assumed to be "inaccurate", we used a uniform distribution to randomly select a separate benchmark pricing error for each episode type.
- For scenarios incorporating "target bias", the target price was reduced by the bias percentage.

Step 3: Estimate distribution of episode costs

FFS costs for each cancer type and setting are randomly pulled from the 100% Medicare RIF percentile set. To fully account for the variation of lower and upper data extremes, we also included the minimum and maximum observed episode costs as "shock" claims. These shocks are triggered in the bottom and top *x*% of simulated scenarios, respectively, where *x* is chosen to reflect the variation in the distribution for each cancer type/setting. This simulation is performed twice to produce two six-month episode periods.

Step 4: Estimate the PBP in the absence of reinsurance

Winsorization, stop-gain, and stop-loss provisions are applied to each simulated episode based on the scenario's settings. For each six-month episode period, the total episode costs from Step 3 are compared to the calculated target payment from Step 2. The results are two implied payments to/from CMS.

Step 5: Estimate reimbursements from and cost of specific coverage

The reimbursement for specific coverage is calculated on each individual episode that was simulated in Step 3:

- Episodes below the specific attachment point are not reimbursed.
- For claims above the specific attachment point, but below the winsorization threshold (the 95th percentile FFS cost), costs above the specific attachment point are reimbursed at 100%.
- For claims above the upper outlier threshold, costs above the upper outlier threshold are not reimbursed by the reinsurer because they are not included in CMS's PBP calculation. Therefore, the specific reimbursement for these claims is equal to the upper outlier threshold less the specific attachment point.

These reinsurance reimbursements were averaged across all "years". The cost of specific reinsurance was then calculated as the average reimbursement, divided by 0.75. This implies that the gross margin retained by a reinsurer would be 25%.

Step 6: Estimate reimbursements from and cost of ASD

Using the same simulated episode costs as Step 3, amounts in excess of the specific attachment point are aggregated. Note that the specific attachment points in this step are not the same as those used in Step 5. We have set the specific attachment points for the ASD equal to the target prices. The ASD is then calculated as 25% of the sum of the target price for all episodes combined. The reimbursement resulting from the excess coverage (specific coverage with ASD) is computed as the sum of the excess amounts less the calculated ASD.

These reinsurance reimbursements were averaged across all "years". The cost of aggregating specific reinsurance was then calculated as the average reimbursement, divided by 0.70. This implies that the gross margin retained by a reinsurer would be 30%. The slightly higher reinsurer margin compensates the reinsurer for the slightly higher volatility of financial results they would expect from aggregating specific coverage.

Step 7: Estimate reimbursements from and cost of aggregate coverage

The FFS cost for all episodes (post-winsorization, if applicable) is summed and compared to the aggregate attachment point (105% of the total target value). Any excess is reimbursable under aggregate coverage until the OCM stop-loss of 20% is triggered, at which point the aggregate reimbursement is capped.

These reinsurance reimbursements were averaged across all "years". The cost of aggregate reinsurance was then calculated as the average reimbursement, divided by 0.40. This implies that the gross margin retained by a reinsurer would be 60%. The higher reinsurer margin compensates the reinsurer for the much higher volatility of financial results they would expect from aggregate coverage. The difference in gross margins applied for specific and aggregate coverage is typical of the differences found in the reinsurance marketplace.

MODELED SCENARIOS

Using our model, we tested several scenarios to understand risk under a wide array of circumstances. The results of these scenarios are described in part throughout the body of this report. We have included results for all scenarios in Appendix A to allow for comparison of the impact of reinsurance under different scenarios.

- Two models substantially similar to the OCM: shared savings (one-sided) and a full, two-sided risk arrangement.
- Three scenarios for accuracy of the OCM episode target price:
  - The target price is unbiased and equal to the average FFS cost of such an episode
  - The target price is unbiased, but inaccurate up to +/-8% of the true expected FFS cost by episode type.
  - The target price is understated on average, with additional variation of up to +/-8% of the true expected FFS cost by episode type. The mean understatement is 4% for one-sided and 2.75% for two-sided models.[19]
- Two practice sizes: large (mean of 1,500 episodes annually) and small (mean of 250 episodes annually).
- Two practice types: hospital-affiliated and non-hospital-affiliated, because episode FFS costs vary by outpatient versus office setting
- Two outlier options: no winsorization and winsorization at 5th/95th percentiles.

CONSIDERATIONS

As described in the Data and Methodology section of this report, we made a number of adjustments to CMS's current OCM framework for the purposes of our modeling, for the sake of simplification and universality. Therefore, the results should not be considered directly applicable to the OCM program, and should not be relied upon as such.

We have modeled a distribution of cancer types that is based on that seen across the entire 100% Medicare RIF data set. If a provider group expected a distribution skewed heavily toward certain cancer types, it may face a very different risk profile than the results presented in this report.

We have not assumed any management savings above what is reflected in the raw data. To the extent a group implements management practices and achieves savings as a result, the risk profile will be affected.

The analysis was developed based on our expectation of viable reinsurance product designs. Actual coverages offered by reinsurers may vary in design and premium from those presented in this report.

[19] The mean understatement is intended to represent a physician group that is not able to achieve any meaningful medical savings, but is still subject to the discount incorporated in the reconciliation calculation.

Section 7: Conclusion

Based on our analysis, we believe reinsurance can be a viable means of limiting the risks providers accept through APMs such as CMS's OCM program. However, providers entering into APMs with the intention of using reinsurance agreements need to understand the implications. A non-exhaustive list of these important implications includes:

- Because reinsurance provides greater protection to smaller physician groups, it will be more expensive for smaller groups.
- Physician groups should expect that, on average, the purchase of reinsurance would have a net cost. There is a cost to be protected against risk.
- Aggregate reinsurance provides stronger protection than specific reinsurance against significant overall losses while generally being less costly. It is also much more likely to result in no reimbursement, but this should not be viewed as a drawback to the coverage.
- Aggregate reinsurance can provide some protection against poor APM design. However, this puts the reinsurer at greater risk, meaning it needs more information and a larger risk margin to provide the coverage.
- Aggregating specific coverage can be an effective alternative for limiting extreme losses, especially for smaller practices.
- No type of reinsurance will completely prevent understated target rates from reducing expected gains (or increasing expected losses) to providers.

Appendix A: All Results

Table Number	Practice Size	Mispricing Scenario	Winsorization	Hospital Affiliation	Risk Model
1	Small	Unbiased, Accurate	5th/95th Percentile	Hosp. Affiliated	One-Sided
2	Small	Unbiased, Inaccurate	5th/95th Percentile	Hosp. Affiliated	One-Sided
3	Small	Biased, Inaccurate	5th/95th Percentile	Hosp. Affiliated	One-Sided
4	Large	Unbiased, Accurate	5th/95th Percentile	Hosp. Affiliated	One-Sided
5	Large	Unbiased, Inaccurate	5th/95th Percentile	Hosp. Affiliated	One-Sided
6	Large	Biased, Inaccurate	5th/95th Percentile	Hosp. Affiliated	One-Sided
7	Small	Unbiased, Accurate	5th/95th Percentile	Hosp. Affiliated	Two-Sided
8	Small	Unbiased, Inaccurate	5th/95th Percentile	Hosp. Affiliated	Two-Sided
9	Small	Biased, Inaccurate	5th/95th Percentile	Hosp. Affiliated	Two-Sided
10	Large	Unbiased, Accurate	5th/95th Percentile	Hosp. Affiliated	Two-Sided
11	Large	Unbiased, Inaccurate	5th/95th Percentile	Hosp. Affiliated	Two-Sided
12	Large	Biased, Inaccurate	5th/95th Percentile	Hosp. Affiliated	Two-Sided
13	Small	Unbiased, Accurate	None	Hosp. Affiliated	One-Sided
14	Small	Unbiased, Inaccurate	None	Hosp. Affiliated	One-Sided
15	Small	Biased, Inaccurate	None	Hosp. Affiliated	One-Sided
16	Large	Unbiased, Accurate	None	Hosp. Affiliated	One-Sided
17	Large	Unbiased, Inaccurate	None	Hosp. Affiliated	One-Sided
18	Large	Biased, Inaccurate	None	Hosp. Affiliated	One-Sided
19	Small	Unbiased, Accurate	None	Hosp. Affiliated	Two-Sided
20	Small	Unbiased, Inaccurate	None	Hosp. Affiliated	Two-Sided
21	Small	Biased, Inaccurate	None	Hosp. Affiliated	Two-Sided
22	Large	Unbiased, Accurate	None	Hosp. Affiliated	Two-Sided
23	Large	Unbiased, Inaccurate	None	Hosp. Affiliated	Two-Sided
24	Large	Biased, Inaccurate	None	Hosp. Affiliated	Two-Sided
25	Small	Unbiased, Accurate	5th/95th Percentile	Non-Hosp. Affiliated	One-Sided
26	Small	Unbiased, Inaccurate	5th/95th Percentile	Non-Hosp. Affiliated	One-Sided
27	Small	Biased, Inaccurate	5th/95th Percentile	Non-Hosp. Affiliated	One-Sided
28	Large	Unbiased, Accurate	5th/95th Percentile	Non-Hosp. Affiliated	One-Sided
29	Large	Unbiased, Inaccurate	5th/95th Percentile	Non-Hosp. Affiliated	One-Sided
30	Large	Biased, Inaccurate	5th/95th Percentile	Non-Hosp. Affiliated	One-Sided
31	Small	Unbiased, Accurate	5th/95th Percentile	Non-Hosp. Affiliated	Two-Sided
32	Small	Unbiased, Inaccurate	5th/95th Percentile	Non-Hosp. Affiliated	Two-Sided
33	Small	Biased, Inaccurate	5th/95th Percentile	Non-Hosp. Affiliated	Two-Sided
34	Large	Unbiased, Accurate	5th/95th Percentile	Non-Hosp. Affiliated	Two-Sided
35	Large	Unbiased, Inaccurate	5th/95th Percentile	Non-Hosp. Affiliated	Two-Sided
36	Large	Biased, Inaccurate	5th/95th Percentile	Non-Hosp. Affiliated	Two-Sided
37	Small	Unbiased, Accurate	None	Non-Hosp. Affiliated	One-Sided
38	Small	Unbiased, Inaccurate	None	Non-Hosp. Affiliated	One-Sided
39	Small	Biased, Inaccurate	None	Non-Hosp. Affiliated	One-Sided
40	Large	Unbiased, Accurate	None	Non-Hosp. Affiliated	One-Sided
41	Large	Unbiased, Inaccurate	None	Non-Hosp. Affiliated	One-Sided
42	Large	Biased, Inaccurate	None	Non-Hosp. Affiliated	One-Sided
43	Small	Unbiased, Accurate	None	Non-Hosp. Affiliated	Two-Sided
44	Small	Unbiased, Inaccurate	None	Non-Hosp. Affiliated	Two-Sided
45	Small	Biased, Inaccurate	None	Non-Hosp. Affiliated	Two-Sided
46	Large	Unbiased, Accurate	None	Non-Hosp. Affiliated	Two-Sided
47	Large	Unbiased, Inaccurate	None	Non-Hosp. Affiliated	Two-Sided
48	Large	Biased, Inaccurate	None	Non-Hosp. Affiliated	Two-Sided

Table Number	Practice Size	Mispricing Scenario	Winsorization	Hospital Affiliation	Risk Model
1	Small	Unbiased, Accurate	5th/95th Percentile	Hosp. Affiliated	One-Sided
2	Small	Unbiased, Inaccurate	5th/95th Percentile	Hosp. Affiliated	One-Sided
3	Small	Biased, Inaccurate	5th/95th Percentile	Hosp. Affiliated	One-Sided
4	Large	Unbiased, Accurate	5th/95th Percentile	Hosp. Affiliated	One-Sided
5	Large	Unbiased, Inaccurate	5th/95th Percentile	Hosp. Affiliated	One-Sided
6	Large	Biased, Inaccurate	5th/95th Percentile	Hosp. Affiliated	One-Sided

Table 1 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	4.2%	n/a	n/a	n/a
50th	1.9%	n/a	n/a	n/a
75th	0.0%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	2.6%	n/a	n/a	n/a
Standard Deviation	2.8%	n/a	n/a	n/a

Table 2 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	4.2%	n/a	n/a	n/a
50th	1.9%	n/a	n/a	n/a
75th	0.0%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	2.7%	n/a	n/a	n/a
Standard Deviation	2.9%	n/a	n/a	n/a

Table 3 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	1.7%	n/a	n/a	n/a
50th	0.0%	n/a	n/a	n/a
75th	0.0%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	1.1%	n/a	n/a	n/a
Standard Deviation	1.8%	n/a	n/a	n/a

Table 4 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	1.7%	n/a	n/a	n/a
50th	0.8%	n/a	n/a	n/a
75th	0.0%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	1.0%	n/a	n/a	n/a
Standard Deviation	1.1%	n/a	n/a	n/a

Table 5 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	1.8%	n/a	n/a	n/a
50th	0.8%	n/a	n/a	n/a
75th	0.0%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	1.1%	n/a	n/a	n/a
Standard Deviation	1.2%	n/a	n/a	n/a

Table 6 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	0.0%	n/a	n/a	n/a
50th	0.0%	n/a	n/a	n/a
75th	0.0%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	0.1%	n/a	n/a	n/a
Standard Deviation	0.3%	n/a	n/a	n/a

Table Number	Practice Size	Mispricing Scenario	Winsorization	Hospital Affiliation	Risk Model
7	Small	Unbiased, Accurate	5th/95th Percentile	Hosp. Affiliated	Two-Sided
8	Small	Unbiased, Inaccurate	5th/95th Percentile	Hosp. Affiliated	Two-Sided
9	Small	Biased, Inaccurate	5th/95th Percentile	Hosp. Affiliated	Two-Sided
10	Large	Unbiased, Accurate	5th/95th Percentile	Hosp. Affiliated	Two-Sided
11	Large	Unbiased, Inaccurate	5th/95th Percentile	Hosp. Affiliated	Two-Sided
12	Large	Biased, Inaccurate	5th/95th Percentile	Hosp. Affiliated	Two-Sided

Table 7 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	3.1%	1.2%	0.6%	2.3%
50th	0.1%	-1.6%	-1.2%	-0.7%
75th	-2.8%	-4.1%	-2.7%	-3.6%
90th	-5.4%	-6.3%	-3.9%	-5.2%
95th	-6.8%	-7.6%	-4.5%	-5.3%
97th	-7.8%	-8.4%	-5.0%	-5.4%
98th	-8.5%	-9.0%	-5.3%	-5.4%
99th	-9.5%	-10.0%	-5.7%	-5.4%
Average	0.2%	-1.4%	-0.8%	-0.3%
Standard Deviation	4.4%	3.9%	2.7%	3.9%

Table 8 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	3.2%	1.3%	0.6%	2.3%
50th	0.1%	-1.6%	-1.3%	-0.8%
75th	-3.0%	-4.2%	-2.8%	-3.8%
90th	-5.6%	-6.5%	-4.0%	-5.3%
95th	-7.0%	-7.8%	-4.7%	-5.4%
97th	-7.9%	-8.6%	-5.1%	-5.4%
98th	-8.5%	-9.2%	-5.4%	-5.5%
99th	-9.7%	-10.0%	-5.8%	-5.5%
Average	0.2%	-1.4%	-0.9%	-0.4%
Standard Deviation	4.6%	4.0%	2.8%	4.0%

Table 9 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	0.4%	-1.8%	-3.0%	-2.1%
50th	-2.7%	-4.4%	-4.4%	-5.1%
75th	-5.5%	-6.8%	-5.7%	-6.6%
90th	-7.9%	-9.0%	-6.7%	-6.9%
95th	-9.3%	-10.2%	-7.3%	-7.0%
97th	-10.2%	-10.9%	-7.8%	-7.1%
98th	-10.8%	-11.5%	-8.1%	-7.2%
99th	-11.8%	-12.2%	-8.5%	-7.2%
Average	-2.4%	-4.2%	-4.2%	-4.0%
Standard Deviation	4.4%	3.8%	2.2%	3.3%

Table 10 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	1.2%	-0.5%	-0.2%	1.2%
50th	0.0%	-1.6%	-0.8%	0.0%
75th	-1.2%	-2.6%	-1.4%	-1.2%
90th	-2.3%	-3.6%	-1.8%	-2.3%
95th	-2.9%	-4.1%	-2.1%	-2.9%
97th	-3.3%	-4.5%	-2.3%	-3.3%
98th	-3.6%	-4.8%	-2.5%	-3.6%
99th	-4.0%	-5.1%	-2.7%	-4.0%
Average	0.0%	-1.6%	-0.8%	0.0%
Standard Deviation	1.8%	1.6%	0.9%	1.8%

Table 11 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	1.4%	-0.3%	-0.2%	1.4%
50th	0.0%	-1.6%	-0.9%	0.0%
75th	-1.4%	-2.8%	-1.5%	-1.4%
90th	-2.7%	-3.9%	-2.0%	-2.7%
95th	-3.4%	-4.5%	-2.3%	-3.4%
97th	-3.8%	-4.9%	-2.5%	-3.8%
98th	-4.2%	-5.2%	-2.7%	-4.2%
99th	-4.7%	-5.7%	-2.9%	-4.5%
Average	0.0%	-1.6%	-0.8%	0.0%
Standard Deviation	2.1%	1.8%	1.0%	2.1%

Table 12 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	-1.3%	-3.2%	-3.6%	-1.7%
50th	-2.7%	-4.4%	-4.2%	-3.1%
75th	-4.0%	-5.6%	-4.7%	-4.5%
90th	-5.2%	-6.5%	-5.2%	-5.0%
95th	-5.8%	-7.1%	-5.5%	-5.0%
97th	-6.3%	-7.5%	-5.7%	-5.0%
98th	-6.6%	-7.8%	-5.8%	-5.0%
99th	-7.1%	-8.2%	-6.0%	-5.1%
Average	-2.6%	-4.4%	-4.2%	-2.9%
Standard Deviation	2.0%	1.7%	0.8%	1.8%

Table Number	Practice Size	Mispricing Scenario	Winsorization	Hospital Affiliation	Risk Model
13	Small	Unbiased, Accurate	None	Hosp. Affiliated	One-Sided
14	Small	Unbiased, Inaccurate	None	Hosp. Affiliated	One-Sided
15	Small	Biased, Inaccurate	None	Hosp. Affiliated	One-Sided
16	Large	Unbiased, Accurate	None	Hosp. Affiliated	One-Sided
17	Large	Unbiased, Inaccurate	None	Hosp. Affiliated	One-Sided
18	Large	Biased, Inaccurate	None	Hosp. Affiliated	One-Sided

Table 13 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	4.9%	n/a	n/a	n/a
50th	2.3%	n/a	n/a	n/a
75th	0.2%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	3.1%	n/a	n/a	n/a
Standard Deviation	3.2%	n/a	n/a	n/a

Table 14 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	5.0%	n/a	n/a	n/a
50th	2.3%	n/a	n/a	n/a
75th	0.1%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	3.2%	n/a	n/a	n/a
Standard Deviation	3.3%	n/a	n/a	n/a

Table 15 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	2.3%	n/a	n/a	n/a
50th	0.1%	n/a	n/a	n/a
75th	0.0%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	1.4%	n/a	n/a	n/a
Standard Deviation	2.2%	n/a	n/a	n/a

Table 16 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	2.0%	n/a	n/a	n/a
50th	1.0%	n/a	n/a	n/a
75th	0.1%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	1.3%	n/a	n/a	n/a
Standard Deviation	1.3%	n/a	n/a	n/a

Table 17 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	2.2%	n/a	n/a	n/a
50th	1.0%	n/a	n/a	n/a
75th	0.0%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	1.4%	n/a	n/a	n/a
Standard Deviation	1.4%	n/a	n/a	n/a

Table 18 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	0.0%	n/a	n/a	n/a
50th	0.0%	n/a	n/a	n/a
75th	0.0%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	0.2%	n/a	n/a	n/a
Standard Deviation	0.5%	n/a	n/a	n/a

Table Number	Practice Size	Mispricing Scenario	Winsorization	Hospital Affiliation	Risk Model
19	Small	Unbiased, Accurate	None	Hosp. Affiliated	Two-Sided
20	Small	Unbiased, Inaccurate	None	Hosp. Affiliated	Two-Sided
21	Small	Biased, Inaccurate	None	Hosp. Affiliated	Two-Sided
22	Large	Unbiased, Accurate	None	Hosp. Affiliated	Two-Sided
23	Large	Unbiased, Inaccurate	None	Hosp. Affiliated	Two-Sided
24	Large	Biased, Inaccurate	None	Hosp. Affiliated	Two-Sided

Table 19 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	3.9%	0.3%	0.0%	2.5%
50th	0.2%	-2.5%	-1.8%	-1.1%
75th	-3.2%	-5.1%	-3.3%	-4.4%
90th	-6.4%	-7.4%	-4.5%	-5.9%
95th	-8.0%	-8.7%	-5.3%	-6.0%
97th	-9.1%	-9.5%	-5.7%	-6.0%
98th	-9.9%	-10.0%	-6.0%	-6.1%
99th	-11.0%	-11.0%	-6.6%	-6.1%
Average	0.4%	-2.3%	-1.4%	-0.5%
Standard Deviation	5.2%	4.1%	2.8%	4.5%

Table 20 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	3.8%	0.3%	0.0%	2.3%
50th	0.3%	-2.5%	-1.8%	-1.1%
75th	-3.3%	-5.2%	-3.4%	-4.5%
90th	-6.5%	-7.5%	-4.6%	-6.0%
95th	-8.3%	-8.8%	-5.4%	-6.1%
97th	-9.4%	-9.7%	-5.8%	-6.1%
98th	-10.1%	-10.3%	-6.1%	-6.2%
99th	-11.3%	-11.4%	-6.6%	-6.2%
Average	0.4%	-2.3%	-1.5%	-0.5%
Standard Deviation	5.4%	4.2%	2.9%	4.6%

Table 21 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	1.0%	-2.7%	-3.7%	-2.3%
50th	-2.6%	-5.4%	-5.1%	-5.6%
75th	-6.1%	-8.0%	-6.5%	-7.5%
90th	-8.9%	-10.2%	-7.7%	-7.9%
95th	-10.6%	-11.5%	-8.4%	-8.0%
97th	-11.6%	-12.2%	-8.8%	-8.1%
98th	-12.2%	-12.7%	-9.0%	-8.2%
99th	-13.2%	-13.5%	-9.6%	-8.3%
Average	-2.4%	-5.3%	-4.9%	-4.4%
Standard Deviation	5.2%	4.0%	2.5%	3.7%

Table 22 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	1.5%	-1.5%	-0.9%	1.5%
50th	0.0%	-2.6%	-1.5%	0.0%
75th	-1.4%	-3.7%	-2.1%	-1.5%
90th	-2.8%	-4.6%	-2.6%	-2.8%
95th	-3.6%	-5.2%	-2.9%	-3.7%
97th	-4.1%	-5.6%	-3.1%	-4.2%
98th	-4.6%	-5.8%	-3.2%	-4.6%
99th	-5.5%	-6.1%	-3.4%	-4.8%
Average	0.0%	-2.5%	-1.5%	0.0%
Standard Deviation	2.2%	1.6%	0.9%	2.2%

Table 23 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	1.7%	-1.3%	-0.8%	1.6%
50th	0.0%	-2.6%	-1.5%	-0.1%
75th	-1.6%	-3.8%	-2.1%	-1.7%
90th	-3.0%	-4.9%	-2.7%	-3.1%
95th	-4.0%	-5.5%	-3.0%	-4.0%
97th	-4.5%	-5.9%	-3.2%	-4.6%
98th	-5.0%	-6.2%	-3.4%	-4.8%
99th	-5.8%	-6.7%	-3.6%	-4.8%
Average	0.0%	-2.5%	-1.4%	0.0%
Standard Deviation	2.5%	1.9%	1.0%	2.4%

Table 24 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	-1.2%	-4.3%	-4.5%	-1.9%
50th	-2.8%	-5.5%	-5.1%	-3.5%
75th	-4.3%	-6.7%	-5.6%	-5.0%
90th	-5.7%	-7.7%	-6.2%	-5.4%
95th	-6.6%	-8.3%	-6.5%	-5.4%
97th	-7.2%	-8.7%	-6.7%	-5.5%
98th	-7.6%	-9.0%	-6.8%	-5.5%
99th	-8.4%	-9.5%	-7.0%	-5.5%
Average	-2.8%	-5.5%	-5.0%	-3.2%
Standard Deviation	2.4%	1.8%	0.9%	2.0%

Table Number	Practice Size	Mispricing Scenario	Winsorization	Hospital Affiliation	Risk Model
25	Small	Unbiased, Accurate	5th/95th Percentile	Non-Hosp. Affiliated	One-Sided
26	Small	Unbiased, Inaccurate	5th/95th Percentile	Non-Hosp. Affiliated	One-Sided
27	Small	Biased, Inaccurate	5th/95th Percentile	Non-Hosp. Affiliated	One-Sided
28	Large	Unbiased, Accurate	5th/95th Percentile	Non-Hosp. Affiliated	One-Sided
29	Large	Unbiased, Inaccurate	5th/95th Percentile	Non-Hosp. Affiliated	One-Sided
30	Large	Biased, Inaccurate	5th/95th Percentile	Non-Hosp. Affiliated	One-Sided

Table 25 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	4.4%	n/a	n/a	n/a
50th	2.0%	n/a	n/a	n/a
75th	0.0%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	2.8%	n/a	n/a	n/a
Standard Deviation	3.0%	n/a	n/a	n/a

Table 26 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	4.5%	n/a	n/a	n/a
50th	2.0%	n/a	n/a	n/a
75th	0.0%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	2.8%	n/a	n/a	n/a
Standard Deviation	3.0%	n/a	n/a	n/a

Table 27 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	1.9%	n/a	n/a	n/a
50th	0.0%	n/a	n/a	n/a
75th	0.0%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	1.2%	n/a	n/a	n/a
Standard Deviation	2.0%	n/a	n/a	n/a

Table 28 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	1.8%	n/a	n/a	n/a
50th	0.8%	n/a	n/a	n/a
75th	0.0%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	1.1%	n/a	n/a	n/a
Standard Deviation	1.2%	n/a	n/a	n/a

Table 29 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	1.9%	n/a	n/a	n/a
50th	0.8%	n/a	n/a	n/a
75th	0.0%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	1.2%	n/a	n/a	n/a
Standard Deviation	1.3%	n/a	n/a	n/a

Table 30 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	0.0%	n/a	n/a	n/a
50th	0.0%	n/a	n/a	n/a
75th	0.0%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	0.1%	n/a	n/a	n/a
Standard Deviation	0.4%	n/a	n/a	n/a

Table Number	Practice Size	Mispricing Scenario	Winsorization	Hospital Affiliation	Risk Model
31	Small	Unbiased, Accurate	5th/95th Percentile	Non-Hosp. Affiliated	Two-Sided
32	Small	Unbiased, Inaccurate	5th/95th Percentile	Non-Hosp. Affiliated	Two-Sided
33	Small	Biased, Inaccurate	5th/95th Percentile	Non-Hosp. Affiliated	Two-Sided
34	Large	Unbiased, Accurate	5th/95th Percentile	Non-Hosp. Affiliated	Two-Sided
35	Large	Unbiased, Inaccurate	5th/95th Percentile	Non-Hosp. Affiliated	Two-Sided
36	Large	Biased, Inaccurate	5th/95th Percentile	Non-Hosp. Affiliated	Two-Sided

Table 31 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	3.4%	1.0%	-0.1%	2.4%
50th	0.0%	-1.9%	-1.7%	-0.9%
75th	-3.1%	-4.6%	-3.2%	-4.0%
90th	-5.7%	-6.9%	-4.3%	-5.3%
95th	-7.2%	-8.1%	-5.0%	-5.5%
97th	-8.2%	-8.9%	-5.4%	-5.5%
98th	-8.8%	-9.5%	-5.8%	-5.5%
99th	-9.8%	-10.4%	-6.2%	-5.6%
Average	0.2%	-1.7%	-1.4%	-0.4%
Standard Deviation	4.7%	4.1%	2.5%	4.2%

Table 32 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	3.5%	1.1%	-0.1%	2.3%
50th	0.0%	-2.0%	-1.8%	-1.1%
75th	-3.2%	-4.6%	-3.2%	-4.2%
90th	-5.8%	-7.0%	-4.4%	-5.4%
95th	-7.4%	-8.3%	-5.1%	-5.5%
97th	-8.4%	-9.3%	-5.6%	-5.6%
98th	-9.1%	-9.9%	-5.9%	-5.6%
99th	-10.4%	-10.8%	-6.4%	-5.7%
Average	0.3%	-1.7%	-1.5%	-0.4%
Standard Deviation	4.9%	4.2%	2.6%	4.3%

Table 33 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	0.5%	-2.1%	-3.6%	-2.4%
50th	-2.7%	-4.8%	-5.1%	-5.4%
75th	-5.7%	-7.4%	-6.4%	-6.9%
90th	-8.3%	-9.6%	-7.5%	-7.2%
95th	-9.8%	-10.8%	-8.1%	-7.4%
97th	-10.6%	-11.6%	-8.5%	-7.5%
98th	-11.2%	-12.1%	-8.8%	-7.5%
99th	-12.2%	-12.9%	-9.2%	-7.6%
Average	-2.5%	-4.7%	-4.9%	-4.2%
Standard Deviation	4.7%	3.9%	2.1%	3.4%

Table 34 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	1.3%	-0.7%	-0.8%	1.3%
50th	0.0%	-1.9%	-1.5%	0.0%
75th	-1.3%	-3.0%	-2.1%	-1.3%
90th	-2.5%	-4.0%	-2.5%	-2.5%
95th	-3.1%	-4.5%	-2.8%	-3.1%
97th	-3.4%	-4.9%	-3.0%	-3.4%
98th	-3.7%	-5.1%	-3.1%	-3.7%
99th	-4.3%	-5.6%	-3.4%	-4.3%
Average	0.0%	-1.9%	-1.4%	0.0%
Standard Deviation	1.9%	1.7%	0.9%	1.9%

Table 35 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	1.5%	-0.6%	-0.8%	1.5%
50th	0.0%	-1.9%	-1.4%	0.0%
75th	-1.4%	-3.1%	-2.1%	-1.5%
90th	-2.7%	-4.2%	-2.6%	-2.8%
95th	-3.5%	-4.8%	-2.9%	-3.5%
97th	-4.0%	-5.3%	-3.1%	-4.0%
98th	-4.3%	-5.6%	-3.3%	-4.4%
99th	-5.0%	-6.1%	-3.5%	-4.5%
Average	0.1%	-1.9%	-1.4%	0.0%
Standard Deviation	2.2%	1.9%	1.0%	2.2%

Table 36 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	-1.2%	-3.5%	-4.2%	-1.7%
50th	-2.6%	-4.7%	-4.8%	-3.2%
75th	-4.1%	-5.9%	-5.4%	-4.6%
90th	-5.3%	-6.9%	-5.9%	-5.0%
95th	-6.1%	-7.6%	-6.2%	-5.1%
97th	-6.6%	-8.0%	-6.4%	-5.1%
98th	-6.9%	-8.2%	-6.5%	-5.1%
99th	-7.3%	-8.6%	-6.8%	-5.1%
Average	-2.6%	-4.7%	-4.8%	-2.9%
Standard Deviation	2.1%	1.8%	0.9%	1.8%

Table Number	Practice Size	Mispricing Scenario	Winsorization	Hospital Affiliation	Risk Model
37	Small	Unbiased, Accurate	None	Non-Hosp. Affiliated	One-Sided
38	Small	Unbiased, Inaccurate	None	Non-Hosp. Affiliated	One-Sided
39	Small	Biased, Inaccurate	None	Non-Hosp. Affiliated	One-Sided
40	Large	Unbiased, Accurate	None	Non-Hosp. Affiliated	One-Sided
41	Large	Unbiased, Inaccurate	None	Non-Hosp. Affiliated	One-Sided
42	Large	Biased, Inaccurate	None	Non-Hosp. Affiliated	One-Sided

Table 37 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	5.1%	n/a	n/a	n/a
50th	2.4%	n/a	n/a	n/a
75th	0.1%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	3.3%	n/a	n/a	n/a
Standard Deviation	3.4%	n/a	n/a	n/a

Table 38 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	5.4%	n/a	n/a	n/a
50th	2.5%	n/a	n/a	n/a
75th	0.2%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	3.4%	n/a	n/a	n/a
Standard Deviation	3.5%	n/a	n/a	n/a

Table 39 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	2.6%	n/a	n/a	n/a
50th	0.3%	n/a	n/a	n/a
75th	0.0%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	1.6%	n/a	n/a	n/a
Standard Deviation	2.4%	n/a	n/a	n/a

Table 40 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	2.1%	n/a	n/a	n/a
50th	1.0%	n/a	n/a	n/a
75th	0.0%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	1.3%	n/a	n/a	n/a
Standard Deviation	1.4%	n/a	n/a	n/a

Table 41 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	2.3%	n/a	n/a	n/a
50th	1.0%	n/a	n/a	n/a
75th	0.0%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	1.4%	n/a	n/a	n/a
Standard Deviation	1.5%	n/a	n/a	n/a

Table 42 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	0.0%	n/a	n/a	n/a
50th	0.0%	n/a	n/a	n/a
75th	0.0%	n/a	n/a	n/a
90th	0.0%	n/a	n/a	n/a
95th	0.0%	n/a	n/a	n/a
97th	0.0%	n/a	n/a	n/a
98th	0.0%	n/a	n/a	n/a
99th	0.0%	n/a	n/a	n/a
Average	0.2%	n/a	n/a	n/a
Standard Deviation	0.5%	n/a	n/a	n/a

Table Number	Practice Size	Mispricing Scenario	Winsorization	Hospital Affiliation	Risk Model
43	Small	Unbiased, Accurate	None	Non-Hosp. Affiliated	Two-Sided
44	Small	Unbiased, Inaccurate	None	Non-Hosp. Affiliated	Two-Sided
45	Small	Biased, Inaccurate	None	Non-Hosp. Affiliated	Two-Sided
46	Large	Unbiased, Accurate	None	Non-Hosp. Affiliated	Two-Sided
47	Large	Unbiased, Inaccurate	None	Non-Hosp. Affiliated	Two-Sided
48	Large	Biased, Inaccurate	None	Non-Hosp. Affiliated	Two-Sided

Table 43 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	4.0%	0.0%	-0.8%	2.4%
50th	0.2%	-2.8%	-2.5%	-1.3%
75th	-3.6%	-5.6%	-4.0%	-4.9%
90th	-6.7%	-8.0%	-5.2%	-6.1%
95th	-8.4%	-9.3%	-5.9%	-6.2%
97th	-9.6%	-10.2%	-6.4%	-6.2%
98th	-10.4%	-10.6%	-6.7%	-6.3%
99th	-11.8%	-11.6%	-7.2%	-6.3%
Average	0.3%	-2.7%	-2.2%	-0.6%
Standard Deviation	5.6%	4.2%	2.5%	4.7%

Table 44 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	4.1%	0.0%	-0.6%	2.4%
50th	0.3%	-2.9%	-2.4%	-1.4%
75th	-3.5%	-5.7%	-3.9%	-4.9%
90th	-6.9%	-8.1%	-5.2%	-6.2%
95th	-8.8%	-9.5%	-6.0%	-6.3%
97th	-9.9%	-10.3%	-6.4%	-6.3%
98th	-10.7%	-11.0%	-6.8%	-6.4%
99th	-11.8%	-11.9%	-7.3%	-6.4%
Average	0.4%	-2.7%	-2.1%	-0.7%
Standard Deviation	5.7%	4.3%	2.6%	4.8%

Table 45 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	1.2%	-3.1%	-4.3%	-2.5%
50th	-2.7%	-5.9%	-5.8%	-5.9%
75th	-6.2%	-8.5%	-7.2%	-7.8%
90th	-9.3%	-10.7%	-8.4%	-8.1%
95th	-10.9%	-12.0%	-9.0%	-8.3%
97th	-11.9%	-12.7%	-9.5%	-8.4%
98th	-12.6%	-13.3%	-9.9%	-8.5%
99th	-13.7%	-14.2%	-10.4%	-8.6%
Average	-2.4%	-5.7%	-5.6%	-4.6%
Standard Deviation	5.4%	4.0%	2.3%	3.8%

Table 46 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	1.6%	-1.7%	-1.5%	1.6%
50th	0.1%	-2.9%	-2.1%	0.0%
75th	-1.5%	-4.0%	-2.7%	-1.5%
90th	-2.8%	-5.0%	-3.3%	-2.8%
95th	-3.6%	-5.5%	-3.6%	-3.7%
97th	-4.2%	-5.9%	-3.7%	-4.2%
98th	-4.6%	-6.2%	-3.9%	-4.6%
99th	-5.2%	-6.6%	-4.1%	-4.8%
Average	0.1%	-2.8%	-2.1%	0.1%
Standard Deviation	2.3%	1.7%	0.9%	2.3%

Table 47 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	1.7%	-1.7%	-1.6%	1.7%
50th	0.0%	-3.0%	-2.3%	-0.1%
75th	-1.7%	-4.3%	-2.9%	-1.8%
90th	-3.3%	-5.4%	-3.5%	-3.4%
95th	-4.2%	-6.1%	-3.9%	-4.3%
97th	-4.9%	-6.5%	-4.1%	-4.7%
98th	-5.2%	-6.8%	-4.2%	-4.8%
99th	-5.9%	-7.2%	-4.4%	-4.8%
Average	0.0%	-2.9%	-2.2%	0.0%
Standard Deviation	2.6%	1.9%	1.0%	2.5%

Table 48 - Distribution of Outcomes (% of Med. FFS Costs)

Outcome Percentile	Without Reinsurance	Specific Reinsurance	Agg. Spec. Reinsurance	Aggregate Reinsurance
25th	-1.1%	-4.7%	-5.1%	-1.9%
50th	-2.8%	-5.9%	-5.8%	-3.5%
75th	-4.4%	-7.1%	-6.4%	-5.2%
90th	-5.9%	-8.2%	-7.0%	-5.5%
95th	-6.8%	-8.8%	-7.3%	-5.5%
97th	-7.4%	-9.2%	-7.5%	-5.5%
98th	-7.8%	-9.5%	-7.7%	-5.5%
99th	-8.5%	-10.0%	-7.9%	-5.5%
Average	-2.7%	-5.9%	-5.8%	-3.2%
Standard Deviation	2.5%	1.8%	0.9%	2.0%

Appendix B: Episode-Initiating HCPCS Codes

HCPCS	Generic Drug Name
C9131	ADO-TRASTUZUMAB EMTANSINE
J9354	ADO-TRASTUZUMAB EMTANSINE
J9015	ALDESLEUKIN
J0202	ALEMTUZUMAB
J9010	ALEMTUZUMAB
Q9979	ALEMTUZUMAB
J9999	ANTINEO, NOC
J8999	ANTINEO, NOC
J7504	ANTITHYMOCYTE GLOBULIN, EQUINE
J7511	ANTITHYMOCYTE GLOBULIN, RABBIT
J9017	ARSENIC TRIOXIDE
J9020	ASPARAGINASE
C9289	ASPARAGINASE ERWINIA
J9019	ASPARAGINASE ERWINIA
C9483	ATEZOLIZUMAB
J9022	ATEZOLIZUMAB
J9023	AVELUMAB
C9491	AVELUMAB
J9025	AZACITIDINE
J9031	BCG (INTRAVESICAL) PER INSTILLATION
C9442	BELINOSTAT
J9032	BELINOSTAT
J9033	BENDAMUSTINE
J9034	BENDAMUSTINE
J9035	BEVACIZUMAB
J9040	BLEOMYCIN SULFATE
C9449	BLINATUMOMAB
J9039	BLINATUMOMAB
J9041	BORTEZOMIB
C9287	BRENTUXIMAB VEDOTIN
J9042	BRENTUXIMAB VEDOTIN
J0594	BUSULFAN
J8510	BUSULFAN
WW020	BUSULFAN
J9043	CABAZITAXEL
J8520	CAPECITABINE
J8521	CAPECITABINE
WW089	CAPECITABINE
WW090	CAPECITABINE
WW091	CAPECITABINE
WW093	CAPECITABINE
WW094	CAPECITABINE
WW096	CAPECITABINE
J9045	CARBOPLATIN
C9295	CARFILZOMIB
J9047	CARFILZOMIB
J9050	CARMUSTINE
J9055	CETUXIMAB
J9060	CISPLATIN
J9062	CISPLATIN
J9065	CLADRIBINE
J9027	CLOFARABINE
J8530	CYCLOPHOSPHAMIDE
J9070	CYCLOPHOSPHAMIDE
J9080	CYCLOPHOSPHAMIDE
J9090	CYCLOPHOSPHAMIDE
J9091	CYCLOPHOSPHAMIDE
J9092	CYCLOPHOSPHAMIDE
J9093	CYCLOPHOSPHAMIDE
J9094	CYCLOPHOSPHAMIDE
J9095	CYCLOPHOSPHAMIDE
J9096	CYCLOPHOSPHAMIDE
J9097	CYCLOPHOSPHAMIDE
J9100	CYTARABINE
J9098	CYTARABINE, LIPOSOMAL
J9130	DACARBAZINE
J9140	DACARBAZINE
J9120	DACTINOMYCIN
J9145	DARATUMUMAB
C9476	DARATUMUMAB
J9150	DAUNORUBICIN
J9151	DAUNORUBICIN, LIPOSOMAL
C9024	DAUNORUBICIN AND CYTARABINE
J0894	DECITABINE
J9155	DEGARELIX
J9160	DENILEUKIN DIFTITOX
J9170	DOCETAXEL
J9171	DOCETAXEL
J9000	DOXORUBICIN
J9001	DOXORUBICIN, LIPOSOMAL
J9002	DOXORUBICIN, LIPOSOMAL
Q2049	DOXORUBICIN, LIPOSOMAL
Q2048	DOXORUBICIN, LIPOSOMAL
Q2050	DOXORUBICIN, LIPOSOMAL
C9492	DURVALUMAB
J9176	ELOTUZUMAB
C9477	ELOTUZUMAB
J9178	EPIRUBICIN
J9179	ERIBULIN
J8560	ETOPOSIDE
J9181	ETOPOSIDE
WW030	ETOPOSIDE
WW031	ETOPOSIDE
WW032	ETOPOSIDE
J9182	ETOPOSIDE
J9200	FLOXURIDINE
J9185	FLUDARABINE
J8562	FLUDARABINE, ORAL
J9190	FLUOROURACIL
J9395	FULVESTRANT
J8565	GEFITINIB
J9201	GEMCITABINE
J9300	GEMTUZUMAB OZOGAMICIN
J9203	GEMTUZUMAB OZOGAMICIN
J9202	GOSERELIN
J1675	HISTRELIN

HCPCS	Generic Drug Name
J9225	HISTRELIN
A9543	IBRITUMOMAB
J9211	IDARUBICIN
J9208	IFOSFAMIDE
C9028	INOTUZUMAB OZOGAMICIN
J9216	INTERFERON, GAMMA 1-B
J9228	IPILIMUMAB
J9206	IRINOTECAN
C9474	IRINOTECAN, LIPOSOMAL
J9205	IRINOTECAN, LIPOSOMAL
J9207	IXABEPILONE
J1930	LANREOTIDE
J1950	LEUPROLIDE
J9217	LEUPROLIDE
J9218	LEUPROLIDE
J9219	LEUPROLIDE
J9230	MECHLORETHAMINE
J8600	MELPHALAN
J9245	MELPHALAN
WW080	MELPHALAN
WW081	MELPHALAN
J9280	MITOMYCIN
J9290	MITOMYCIN
J9291	MITOMYCIN
J9293	MITOXANTRONE
J9295	NECITUMUMAB
C9475	NECITUMUMAB
J9261	NELARABINE
C9453	NIVOLUMAB
J9299	NIVOLUMAB
C9021	OBINUTUZUMAB
J9301	OBINUTUZUMAB
J2353	OCTREOTIDE
J9302	OFATUMUMAB
J9285	OLARATUMAB
C9485	OLARATUMAB
C9297	OMACETAXINE
J9262	OMACETAXINE
J9263	OXALIPLATIN
J9265	PACLITAXEL
J9267	PACLITAXEL
J9264	PACLITAXEL, PROTEIN-BOUND
J9303	PANITUMUMAB
J9266	PEGASPARGASE
C9027	PEMBROLIZUMAB
J9271	PEMBROLIZUMAB
J9305	PEMETREXED
J9268	PENTOSTATIN
C9292	PERTUZUMAB
J9306	PERTUZUMAB
J9307	PRALATREXATE
C9025	RAMUCIRUMAB
J9308	RAMUCIRUMAB
J9310	RITUXIMAB
J9315	ROMIDEPSIN
C9455	SILTUXIMAB
J2860	SILTUXIMAB
Q2043	SIPULEUCEL-T
J9320	STREPTOZOCIN
J9325	TALIMOGENE LAHERPAREPVEC
C9472	TALIMOGENE LAHERPAREPVEC
J8700	TEMOZOLOMIDE
J9328	TEMOZOLOMIDE
WW002	TEMOZOLOMIDE
WW003	TEMOZOLOMIDE
WW004	TEMOZOLOMIDE
WW005	TEMOZOLOMIDE
WW006	TEMOZOLOMIDE
WW007	TEMOZOLOMIDE
WW008	TEMOZOLOMIDE
WW009	TEMOZOLOMIDE
J9330	TEMSIROLIMUS
Q2017	TENIPOSIDE
J9340	THIOTEPA
J8705	TOPOTECAN
J9350	TOPOTECAN
J9351	TOPOTECAN
WW140	TOPOTECAN
A9545	TOSITUMOMAB
J9352	TRABECTEDIN
C9480	TRABECTEDIN
J9355	TRASTUZUMAB
C9016	TRIPTORELIN
J3315	TRIPTORELIN
J9357	VALRUBICIN
J9360	VINBLASTINE
J9370	VINCRISTINE
J9375	VINCRISTINE
J9380	VINCRISTINE
J9371	VINCRISTINE, LIPOSOMAL
J9390	VINORELBINE
C9296	ZIV-AFLIBERCEPT
J9400	ZIV-AFLIBERCEPT

Appendix C: Episode-Initiating NDC Codes

NDC Code	Generic Drug Name
578940150	ABIRATERONE
578940184	ABIRATERONE
578940195	ABIRATERONE
502420087	ADO-TRASTUZUMAB EMTANSINE
502420088	ADO-TRASTUZUMAB EMTANSINE
005970137	AFATINIB
005970138	AFATINIB
005970141	AFATINIB
000024483	ABEMACICLIB
000024815	ABEMACICLIB
000025337	ABEMACICLIB
000026216	ABEMACICLIB
003100512	ACALABRUTINIB
000780495	ALDESLEUKIN
170890380	ALDESLEUKIN
654830116	ALDESLEUKIN
548685596	ALDESLEUKIN
502420130	ALECTINIB
584680200	ALEMTUZUMAB
584680357	ALEMTUZUMAB
504190357	ALEMTUZUMAB
628560001	ALTRETAMINE
000540164	ANASTROZOLE
000937536	ANASTROZOLE
001790068	ANASTROZOLE
003100201	ANASTROZOLE
003786034	ANASTROZOLE
007815356	ANASTROZOLE
009046195	ANASTROZOLE
009046229	ANASTROZOLE
165710421	ANASTROZOLE
167290035	ANASTROZOLE
216950990	ANASTROZOLE
420430180	ANASTROZOLE
422540161	ANASTROZOLE
430630383	ANASTROZOLE
510790323	ANASTROZOLE
516550638	ANASTROZOLE
519910620	ANASTROZOLE
545696198	ANASTROZOLE
500901193	ANASTROZOLE
500901918	ANASTROZOLE
500902005	ANASTROZOLE
500902118	ANASTROZOLE
500902453	ANASTROZOLE
548685000	ANASTROZOLE
548686130	ANASTROZOLE
551110647	ANASTROZOLE
602580866	ANASTROZOLE
604290286	ANASTROZOLE
605052985	ANASTROZOLE
606870112	ANASTROZOLE
607630376	ANASTROZOLE
621750710	ANASTROZOLE
627560250	ANASTROZOLE
631870080	ANASTROZOLE
633230129	ANASTROZOLE
636295269	ANASTROZOLE
636720015	ANASTROZOLE
658410743	ANASTROZOLE
663360533	ANASTROZOLE
664350415	ANASTROZOLE
678770171	ANASTROZOLE
680010155	ANASTROZOLE
680840448	ANASTROZOLE
683820209	ANASTROZOLE
691890035	ANASTROZOLE
620330376	ANASTROZOLE
422910105	ANASTROZOLE
001151261	ANASTROZOLE
638500010	ANASTROZOLE
163640035	ANASTROZOLE
687886774	ANASTROZOLE
680711682	ANASTROZOLE
584680080	ANTI-THYMOCYTE GLOBULIN, RABBIT
002200522	ARSENIC TRIOXIDE
101911989	ARSENIC TRIOXIDE
549730605	ARSENIC TRIOXIDE
549732905	ARSENIC TRIOXIDE
621064878	ARSENIC TRIOXIDE
634590600	ARSENIC TRIOXIDE
684280033	ARSENIC TRIOXIDE
684280083	ARSENIC TRIOXIDE
684280225	ARSENIC TRIOXIDE
764721132	ARSENIC TRIOXIDE
611260517	ARSENIC TRIOXIDE
579020249	ASPARAGINASE
673860411	ASPARAGINASE
502420917	ATEZOLIZUMAB
440873535	AVELUMAB
000690145	AXITINIB
000690151	AXITINIB
635390026	AXITINIB
635390044	AXITINIB
538692323	AXITINIB
538690262	AXITINIB
005912897	AZACITIDINE
007813253	AZACITIDINE
007819253	AZACITIDINE
435980305	AZACITIDINE
435980465	AZACITIDINE
595720102	AZACITIDINE
633230771	AZACITIDINE

NDC Code	Generic Drug Name
637590003	AZACITIDINE
646790096	AZACITIDINE
674570254	AZACITIDINE
690970346	AZACITIDINE
690970359	AZACITIDINE
139250523	AZACITIDINE
519910797	AZACITIDINE
680010313	AZACITIDINE
000520602	BCG (BACILLUS CALMETTE-GUERIN) LIVE VAX, INTRAVESICAL
492810880	BCG (BACILLUS CALMETTE-GUERIN) LIVE VAX, INTRAVESICAL
681520108	BELINOSTAT
634590348	BENDAMUSTINE
634590395	BENDAMUSTINE
634590396	BENDAMUSTINE
634590390	BENDAMUSTINE
634590391	BENDAMUSTINE
502420060	BEVACIZUMAB
502420061	BEVACIZUMAB
001875525	BEXAROTENE
001875526	BEXAROTENE
003786955	BEXAROTENE
422920007	BEXAROTENE
628560602	BEXAROTENE
628560604	BEXAROTENE
686820003	BEXAROTENE
000930220	BICALUTAMIDE
003100705	BICALUTAMIDE
003787017	BICALUTAMIDE
007815409	BICALUTAMIDE
009046019	BICALUTAMIDE
167140571	BICALUTAMIDE
167290023	BICALUTAMIDE
416160485	BICALUTAMIDE
510790692	BICALUTAMIDE
519910560	BICALUTAMIDE
521250709	BICALUTAMIDE
548684503	BICALUTAMIDE
548686133	BICALUTAMIDE
604290226	BICALUTAMIDE
605052642	BICALUTAMIDE
636720005	BICALUTAMIDE
658410613	BICALUTAMIDE
672530191	BICALUTAMIDE
680840374	BICALUTAMIDE
680840612	BICALUTAMIDE
683820224	BICALUTAMIDE
621750132	BICALUTAMIDE
163640023	BICALUTAMIDE
163640091	BICALUTAMIDE
605053542	BICALUTAMIDE
422910168	BICALUTAMIDE
473350485	BICALUTAMIDE
604290177	BICALUTAMIDE
636295321	BICALUTAMIDE

NDC Code	Generic Drug Name
691890298	BICALUTAMIDE
007033154	BLEOMYCIN
007033155	BLEOMYCIN
553900005	BLEOMYCIN
553900006	BLEOMYCIN
617030323	BLEOMYCIN
617030332	BLEOMYCIN
633230136	BLEOMYCIN
633230137	BLEOMYCIN
701211567	BLEOMYCIN
555130160	BLINATUMOMAB
630200049	BORTEZOMIB
000690135	BOSUTINIB
000690193	BOSUTINIB
635390117	BOSUTINIB
000690136	BOSUTINIB
511440050	BRENTUXIMAB VEDOTIN
001730713	BUSULFAN
005170920	BUSULFAN
591480047	BUSULFAN
591480070	BUSULFAN
763880713	BUSULFAN
250210241	BUSULFAN
518170170	BUSULFAN
163640424	BUSULFAN
000245824	CABAZITAXEL
423880013	CABOZANTINIB
423880011	CABOZANTINIB
423880012	CABOZANTINIB
423880023	CABOZANTINIB
423880024	CABOZANTINIB
423880025	CABOZANTINIB
000041100	CAPECITABINE
000041101	CAPECITABINE
000540271	CAPECITABINE
000540272	CAPECITABINE
000937473	CAPECITABINE
000937474	CAPECITABINE
001790149	CAPECITABINE
001790195	CAPECITABINE
001790229	CAPECITABINE
003782511	CAPECITABINE
003782512	CAPECITABINE
167140467	CAPECITABINE
167140468	CAPECITABINE
167290072	CAPECITABINE
167290073	CAPECITABINE
422910167	CAPECITABINE
422910190	CAPECITABINE
422910191	CAPECITABINE
510790510	CAPECITABINE
538080411	CAPECITABINE
548684143	CAPECITABINE
548685260	CAPECITABINE
606870149	CAPECITABINE
637593000	CAPECITABINE

NDC Code	Generic Drug Name
637593001	CAPECITABINE
649800276	CAPECITABINE
649800277	CAPECITABINE
651620843	CAPECITABINE
651620844	CAPECITABINE
163640072	CAPECITABINE
163640073	CAPECITABINE
597650072	CAPECITABINE
597650073	CAPECITABINE
007033249	CARBOPLATIN
007034239	CARBOPLATIN
007034244	CARBOPLATIN
007034246	CARBOPLATIN
007034248	CARBOPLATIN
250210202	CARBOPLATIN
473350150	CARBOPLATIN
473350151	CARBOPLATIN
473350284	CARBOPLATIN
473350300	CARBOPLATIN
553900150	CARBOPLATIN
553900151	CARBOPLATIN
553900152	CARBOPLATIN
553900153	CARBOPLATIN
553900154	CARBOPLATIN
553900155	CARBOPLATIN
553900156	CARBOPLATIN
572770105	CARBOPLATIN
572770106	CARBOPLATIN
572770107	CARBOPLATIN
617030339	CARBOPLATIN
617030360	CARBOPLATIN
633230172	CARBOPLATIN
667580047	CARBOPLATIN
674570491	CARBOPLATIN
674570492	CARBOPLATIN
674570493	CARBOPLATIN
674570494	CARBOPLATIN
674570608	CARBOPLATIN
680830190	CARBOPLATIN
680830191	CARBOPLATIN
680830192	CARBOPLATIN
680830193	CARBOPLATIN
000153213	CARBOPLATIN
000153214	CARBOPLATIN
000153215	CARBOPLATIN
000153210	CARBOPLATIN
000153211	CARBOPLATIN
000153212	CARBOPLATIN
000153216	CARBOPLATIN
416160151	CARBOPLATIN
416160300	CARBOPLATIN
416160284	CARBOPLATIN
501110965	CARBOPLATIN
501110966	CARBOPLATIN
501110967	CARBOPLATIN
416160150	CARBOPLATIN

NDC Code	Generic Drug Name
473510001	CARBOPLATIN
540870339	CARBOPLATIN
167290295	CARBOPLATIN
597650295	CARBOPLATIN
507420445	CARBOPLATIN
507420446	CARBOPLATIN
507420447	CARBOPLATIN
507420448	CARBOPLATIN
400330202	CARBOPLATIN
712880100	CARBOPLATIN
760750101	CARFILZOMIB
760750102	CARFILZOMIB
000153012	CARMUSTINE
231550261	CARMUSTINE
243380050	CARMUSTINE
628560177	CARMUSTINE
000780640	CERITINIB
667330948	CETUXIMAB
667330958	CETUXIMAB
708350004	CETUXIMAB
708350003	CETUXIMAB
001730635	CHLORAMBUCIL
763880635	CHLORAMBUCIL
548681126	CHLORAMBUCIL
000153072	CISPLATIN
000690081	CISPLATIN
000690084	CISPLATIN
007035747	CISPLATIN
007035748	CISPLATIN
167290288	CISPLATIN
445670509	CISPLATIN
445670510	CISPLATIN
445670511	CISPLATIN
477810609	CISPLATIN
477810610	CISPLATIN
553900099	CISPLATIN
553900112	CISPLATIN
553900187	CISPLATIN
553900414	CISPLATIN
611260003	CISPLATIN
611260004	CISPLATIN
633230103	CISPLATIN
674570424	CISPLATIN
674570425	CISPLATIN
680010283	CISPLATIN
680830162	CISPLATIN
680830163	CISPLATIN
708600206	CISPLATIN
473510004	CISPLATIN
427910100	CISPLATIN
427910101	CISPLATIN
611260509	CISPLATIN
611260510	CISPLATIN
597650288	CISPLATIN
611260511	CISPLATIN
000690086	CLADRIBINE

NDC Code	Generic Drug Name
000690201	CLADRIBINE
473510017	CLADRIBINE
553900115	CLADRIBINE
553900124	CLADRIBINE
596760201	CLADRIBINE
633230140	CLADRIBINE
674570450	CLADRIBINE
674570451	CLADRIBINE
473510024	CLADRIBINE
000245860	CLOFARABINE
584680100	CLOFARABINE
633230572	CLOFARABINE
009551746	CLOFARABINE
000245917	CLOFARABINE
502420717	COBIMETINIB
504190385	COPANLISIB
000698140	CRIZOTINIB
000698141	CRIZOTINIB
538692230	CRIZOTINIB
538692231	CRIZOTINIB
000540382	CYCLOPHOSPHAMIDE
000540383	CYCLOPHOSPHAMIDE
007813233	CYCLOPHOSPHAMIDE
007813244	CYCLOPHOSPHAMIDE
007813255	CYCLOPHOSPHAMIDE
100190935	CYCLOPHOSPHAMIDE
100190936	CYCLOPHOSPHAMIDE
100190937	CYCLOPHOSPHAMIDE
100190938	CYCLOPHOSPHAMIDE
100190939	CYCLOPHOSPHAMIDE
100190942	CYCLOPHOSPHAMIDE
100190943	CYCLOPHOSPHAMIDE
100190944	CYCLOPHOSPHAMIDE
100190945	CYCLOPHOSPHAMIDE
100190955	CYCLOPHOSPHAMIDE
100190956	CYCLOPHOSPHAMIDE
100190957	CYCLOPHOSPHAMIDE
100190988	CYCLOPHOSPHAMIDE
100190989	CYCLOPHOSPHAMIDE
100190990	CYCLOPHOSPHAMIDE
548685005	CYCLOPHOSPHAMIDE
548685218	CYCLOPHOSPHAMIDE
691890382	CYCLOPHOSPHAMIDE
691890383	CYCLOPHOSPHAMIDE
000150502	CYCLOPHOSPHAMIDE
000150505	CYCLOPHOSPHAMIDE
000150506	CYCLOPHOSPHAMIDE
000150503	CYCLOPHOSPHAMIDE
000150504	CYCLOPHOSPHAMIDE
000544129	CYCLOPHOSPHAMIDE
000544130	CYCLOPHOSPHAMIDE
578843071	CYCLOPHOSPHAMIDE
578843072	CYCLOPHOSPHAMIDE
578843073	CYCLOPHOSPHAMIDE
000690152	CYTARABINE
000690153	CYTARABINE
000690154	CYTARABINE
000690155	CYTARABINE
553900131	CYTARABINE
553900132	CYTARABINE
553900133	CYTARABINE
553900134	CYTARABINE
553900806	CYTARABINE
553900807	CYTARABINE
553900808	CYTARABINE
553900809	CYTARABINE
617030303	CYTARABINE
617030304	CYTARABINE
617030305	CYTARABINE
617030319	CYTARABINE
633230120	CYTARABINE
674570452	CYTARABINE
674570454	CYTARABINE
674570455	CYTARABINE
674570615	CYTARABINE
473510027	CYTARABINE
473510026	CYTARABINE
473510025	CYTARABINE
473510029	CYTARABINE
540870305	CYTARABINE
540870319	CYTARABINE
510230319	CYTARABINE
510230305	CYTARABINE
510230303	CYTARABINE
510230304	CYTARABINE
576650331	CYTARABINE, LIPOSOMAL
000780681	DABRAFENIB
000780682	DABRAFENIB
001730846	DABRAFENIB
001730847	DABRAFENIB
007035075	DACARBAZINE
553900090	DACARBAZINE
553900339	DACARBAZINE
617030327	DACARBAZINE
633230127	DACARBAZINE
633230128	DACARBAZINE
540870327	DACARBAZINE
510230327	DACARBAZINE
552920811	DACTINOMYCIN
553900337	DACTINOMYCIN
673860811	DACTINOMYCIN
005170950	DACTINOMYCIN
686250811	DACTINOMYCIN
533990811	DACTINOMYCIN
578940502	DARATUMUMAB
621950210	DARATUMUMAB
621950200	DARATUMUMAB
000030524	DASATINIB
000030527	DASATINIB
000030528	DASATINIB
000030852	DASATINIB
000030855	DASATINIB

NDC Code	Generic Drug Name
000030857	DASATINIB
548685759	DASATINIB
605053628	DASATINIB
605053629	DASATINIB
605053630	DASATINIB
605053631	DASATINIB
001860527	DASATINIB
001860528	DASATINIB
001860524	DASATINIB
001860855	DASATINIB
001860852	DASATINIB
001860857	DASATINIB
426580007	DAUNORUBICIN
007035233	DAUNORUBICIN
553900108	DAUNORUBICIN
553900142	DAUNORUBICIN
553900281	DAUNORUBICIN
553900805	DAUNORUBICIN
108850001	DAUNORUBICIN, LIPOSOMAL
687270745	DAUNORUBICIN and CYTARABINE
007813139	DECITABINE
167290224	DECITABINE
427370110	DECITABINE
435980348	DECITABINE
435980427	DECITABINE
473350361	DECITABINE
551110556	DECITABINE
591480046	DECITABINE
628560600	DECITABINE
690970285	DECITABINE
597650224	DECITABINE
674570316	DECITABINE
555668301	DEGARELIX
555668303	DEGARELIX
555668401	DEGARELIX
555668403	DEGARELIX
628560603	DENILEUKIN DIFTITOX
663020014	DINUTUXIMAB
000699141	DOCETAXEL
000699142	DOCETAXEL
000699144	DOCETAXEL
000758001	DOCETAXEL
000758003	DOCETAXEL
000758004	DOCETAXEL
000758005	DOCETAXEL
004090201	DOCETAXEL
004090366	DOCETAXEL
004090367	DOCETAXEL
004090368	DOCETAXEL
004090369	DOCETAXEL
007035720	DOCETAXEL
007035730	DOCETAXEL
009551020	DOCETAXEL
009551021	DOCETAXEL
009551022	DOCETAXEL
167140465	DOCETAXEL
167140500	DOCETAXEL
167290120	DOCETAXEL
167290228	DOCETAXEL
167290231	DOCETAXEL
167290267	DOCETAXEL
250210222	DOCETAXEL
398222120	DOCETAXEL
398222180	DOCETAXEL
398222200	DOCETAXEL
423670121	DOCETAXEL
435980258	DOCETAXEL
435980259	DOCETAXEL
459630734	DOCETAXEL
459630765	DOCETAXEL
459630781	DOCETAXEL
459630790	DOCETAXEL
473350285	DOCETAXEL
473350286	DOCETAXEL
578843021	DOCETAXEL
637390932	DOCETAXEL
637390971	DOCETAXEL
667580050	DOCETAXEL
667580950	DOCETAXEL
510230366	DOCETAXEL
510230367	DOCETAXEL
510230368	DOCETAXEL
435980611	DOCETAXEL
435980610	DOCETAXEL
125168003	DOCETAXEL
181110013	DOCETAXEL
163640231	DOCETAXEL
163640267	DOCETAXEL
597650231	DOCETAXEL
597650267	DOCETAXEL
125168004	DOCETAXEL
128540803	DOCETAXEL
128540804	DOCETAXEL
128540805	DOCETAXEL
653925000	DOCETAXEL
578843041	DOCETAXEL
578843042	DOCETAXEL
578843043	DOCETAXEL
000690170	DOXORUBICIN
000690171	DOXORUBICIN
000693030	DOXORUBICIN
000693031	DOXORUBICIN
000693032	DOXORUBICIN
000693033	DOXORUBICIN
000693034	DOXORUBICIN
000694004	DOXORUBICIN
000694015	DOXORUBICIN
000694026	DOXORUBICIN
000694030	DOXORUBICIN
000694031	DOXORUBICIN
000694032	DOXORUBICIN
000694033	DOXORUBICIN

NDC Code	Generic Drug Name
000694034	DOXORUBICIN
000694037	DOXORUBICIN
001439547	DOXORUBICIN
001439548	DOXORUBICIN
001439549	DOXORUBICIN
004090124	DOXORUBICIN
007035040	DOXORUBICIN
007035043	DOXORUBICIN
007035046	DOXORUBICIN
167140742	DOXORUBICIN
167140856	DOXORUBICIN
435980283	DOXORUBICIN
435980541	DOXORUBICIN
250210207	DOXORUBICIN
459630733	DOXORUBICIN
627560826	DOXORUBICIN
627560827	DOXORUBICIN
633230101	DOXORUBICIN
633230883	DOXORUBICIN
674570393	DOXORUBICIN
674570394	DOXORUBICIN
674570395	DOXORUBICIN
674570396	DOXORUBICIN
674570436	DOXORUBICIN
674570478	DOXORUBICIN
680830248	DOXORUBICIN
680830249	DOXORUBICIN
680830250	DOXORUBICIN
001439546	DOXORUBICIN
531500314	DOXORUBICIN
531500315	DOXORUBICIN
531500317	DOXORUBICIN
531500320	DOXORUBICIN
553900231	DOXORUBICIN
553900232	DOXORUBICIN
553900233	DOXORUBICIN
553900235	DOXORUBICIN
553900236	DOXORUBICIN
553900237	DOXORUBICIN
553900238	DOXORUBICIN
553900241	DOXORUBICIN
553900242	DOXORUBICIN
553900243	DOXORUBICIN
553900245	DOXORUBICIN
553900246	DOXORUBICIN
553900247	DOXORUBICIN
553900248	DOXORUBICIN
596760966	DOXORUBICIN
701211218	DOXORUBICIN
701211219	DOXORUBICIN
473350049	DOXORUBICIN, LIPOSOMAL
473350050	DOXORUBICIN, LIPOSOMAL
473350082	DOXORUBICIN, LIPOSOMAL
473350083	DOXORUBICIN, LIPOSOMAL
596760960	DOXORUBICIN, LIPOSOMAL
000032291	ELOTUZUMAB
000034522	ELOTUZUMAB
005902291	ELOTUZUMAB
005904522	ELOTUZUMAB
595720705	ENASIDENIB
595720710	ENASIDENIB
004690125	ENZALUTAMIDE
000095091	EPIRUBICIN
000095093	EPIRUBICIN
001151675	EPIRUBICIN
007033067	EPIRUBICIN
001439202	EPIRUBICIN
001439203	EPIRUBICIN
007033069	EPIRUBICIN
250210203	EPIRUBICIN
459630608	EPIRUBICIN
531040211	EPIRUBICIN
531500247	EPIRUBICIN
531500250	EPIRUBICIN
553900207	EPIRUBICIN
553900208	EPIRUBICIN
597625091	EPIRUBICIN
597625093	EPIRUBICIN
599230701	EPIRUBICIN
617030347	EPIRUBICIN
617030348	EPIRUBICIN
617030359	EPIRUBICIN
667580042	EPIRUBICIN
674570357	EPIRUBICIN
674570358	EPIRUBICIN
000097224	EQUINE THYMOCYTE IMMUNE GLOBULIN
628560389	ERIBULIN
502420062	ERLOTINIB
502420063	ERLOTINIB
502420064	ERLOTINIB
548685290	ERLOTINIB
548685447	ERLOTINIB
548685474	ERLOTINIB
691890063	ERLOTINIB
000130132	ESTRAMUSTINE
000153404	ETOPOSIDE
001439510	ETOPOSIDE
001439511	ETOPOSIDE
001439512	ETOPOSIDE
003783266	ETOPOSIDE
007035653	ETOPOSIDE
007035656	ETOPOSIDE
007035657	ETOPOSIDE
167290114	ETOPOSIDE
167290262	ETOPOSIDE
426050031	ETOPOSIDE
426050032	ETOPOSIDE
426050033	ETOPOSIDE
553900291	ETOPOSIDE
553900292	ETOPOSIDE
553900293	ETOPOSIDE

NDC Code	Generic Drug Name
553900491	ETOPOSIDE
553900492	ETOPOSIDE
553900493	ETOPOSIDE
633230104	ETOPOSIDE
680010265	ETOPOSIDE
000153084	ETOPOSIDE
000153061	ETOPOSIDE
000153062	ETOPOSIDE
000153091	ETOPOSIDE
000153095	ETOPOSIDE
163640114	ETOPOSIDE
000780566	EVEROLIMUS
000780567	EVEROLIMUS
000780594	EVEROLIMUS
000780620	EVEROLIMUS
000780626	EVEROLIMUS
000780627	EVEROLIMUS
000780628	EVEROLIMUS
000097663	EXEMESTANE
000540080	EXEMESTANE
003785001	EXEMESTANE
477810108	EXEMESTANE
548685261	EXEMESTANE
597622858	EXEMESTANE
606870132	EXEMESTANE
108297663	EXEMESTANE
108292858	EXEMESTANE
008320595	EXEMESTANE
553900135	FLOXURIDINE
633230145	FLOXURIDINE
617030331	FLOXURIDINE
000245820	FLUDARABINE
000699321	FLUDARABINE
007034852	FLUDARABINE
007035854	FLUDARABINE
250210205	FLUDARABINE
250210237	FLUDARABINE
250210242	FLUDARABINE
459630609	FLUDARABINE
459630621	FLUDARABINE
617030344	FLUDARABINE
633230192	FLUDARABINE
633230196	FLUDARABINE
667580046	FLUDARABINE
674570238	FLUDARABINE
674570268	FLUDARABINE
674570495	FLUDARABINE
000690169	FLUOROURACIL
000690173	FLUOROURACIL
000690174	FLUOROURACIL
000690176	FLUOROURACIL
007033015	FLUOROURACIL
007033018	FLUOROURACIL
007033019	FLUOROURACIL
101390063	FLUOROURACIL
167290276	FLUOROURACIL
250210215	FLUOROURACIL
435470258	FLUOROURACIL
435470259	FLUOROURACIL
633230117	FLUOROURACIL
667580044	FLUOROURACIL
667580054	FLUOROURACIL
680010266	FLUOROURACIL
473510033	FLUOROURACIL
163640276	FLUOROURACIL
597650276	FLUOROURACIL
400330215	FLUOROURACIL
681520106	FLUOROURACIL
680830269	FLUOROURACIL
680830270	FLUOROURACIL
001724960	FLUTAMIDE
005912466	FLUTAMIDE
498840753	FLUTAMIDE
604290272	FLUTAMIDE
690970915	FLUTAMIDE
001851125	FLUTAMIDE
000850525	FLUTAMIDE
555670150	FLUTAMIDE
005550870	FLUTAMIDE
548684628	FLUTAMIDE
003100720	FULVESTRANT
621950072	FULVESTRANT
003100482	GEFITINIB
000027501	GEMCITABINE
007035775	GEMCITABINE
007035778	GEMCITABINE
007813282	GEMCITABINE
007813283	GEMCITABINE
167290092	GEMCITABINE
167290117	GEMCITABINE
167290118	GEMCITABINE
231550213	GEMCITABINE
231550214	GEMCITABINE
231550483	GEMCITABINE
231550484	GEMCITABINE
231550528	GEMCITABINE
231550529	GEMCITABINE
250210208	GEMCITABINE
250210209	GEMCITABINE
250210234	GEMCITABINE
250210235	GEMCITABINE
422360001	GEMCITABINE
422360002	GEMCITABINE
459630612	GEMCITABINE
459630619	GEMCITABINE
459630623	GEMCITABINE
459630624	GEMCITABINE
459630636	GEMCITABINE
473350153	GEMCITABINE
473350154	GEMCITABINE
551110686	GEMCITABINE
551110687	GEMCITABINE

NDC Code	Generic Drug Name
553900391	GEMCITABINE
578844001	GEMCITABINE
633230102	GEMCITABINE
633230125	GEMCITABINE
633230126	GEMCITABINE
674570462	GEMCITABINE
674570463	GEMCITABINE
674570464	GEMCITABINE
680830148	GEMCITABINE
680830149	GEMCITABINE
000027502	GEMCITABINE
000693857	GEMCITABINE
000693858	GEMCITABINE
000693859	GEMCITABINE
004090181	GEMCITABINE
004090182	GEMCITABINE
004090183	GEMCITABINE
004090185	GEMCITABINE
004090186	GEMCITABINE
004090187	GEMCITABINE
005913562	GEMCITABINE
005913563	GEMCITABINE
459630620	GEMCITABINE
578844002	GEMCITABINE
680010282	GEMCITABINE
690970313	GEMCITABINE
690970314	GEMCITABINE
708600205	GEMCITABINE
708600204	GEMCITABINE
000084510	GEMTUZUMAB OZOGAMICIN
003100950	GOSERELIN
003100951	GOSERELIN
679790500	HISTRELIN
681520103	IBRITUMOMAB TIUXETAN
579620140	IBRUTINIB
000132576	IDARUBICIN
000132586	IDARUBICIN
000132596	IDARUBICIN
001439217	IDARUBICIN
001439218	IDARUBICIN
001439219	IDARUBICIN
007034154	IDARUBICIN
007034155	IDARUBICIN
007034156	IDARUBICIN
531500336	IDARUBICIN
531500386	IDARUBICIN
531500411	IDARUBICIN
633230194	IDARUBICIN
667580055	IDARUBICIN
619581701	IDELALISIB
619581702	IDELALISIB
000694495	IFOSFAMIDE
000694496	IFOSFAMIDE
003383991	IFOSFAMIDE
003383993	IFOSFAMIDE
007033427	IFOSFAMIDE
007033429	IFOSFAMIDE
007034100	IFOSFAMIDE
007034106	IFOSFAMIDE
007034116	IFOSFAMIDE
100190925	IFOSFAMIDE
100190926	IFOSFAMIDE
553900047	IFOSFAMIDE
553900048	IFOSFAMIDE
633230142	IFOSFAMIDE
633230174	IFOSFAMIDE
674570429	IFOSFAMIDE
674570443	IFOSFAMIDE
674570609	IFOSFAMIDE
000150556	IFOSFAMIDE
000150557	IFOSFAMIDE
473510032	IFOSFAMIDE
426050026	IFOSFAMIDE
426050025	IFOSFAMIDE
001439531	IFOSFAMIDE
001439530	IFOSFAMIDE
003782245	IMATINIB
003782246	IMATINIB
000780401	IMATINIB
000780438	IMATINIB
000780649	IMATINIB
000937629	IMATINIB
000937630	IMATINIB
422910351	IMATINIB
422910352	IMATINIB
473350472	IMATINIB
473350475	IMATINIB
502680426	IMATINIB
502680427	IMATINIB
548685289	IMATINIB
548685427	IMATINIB
604290925	IMATINIB
604290926	IMATINIB
605052900	IMATINIB
605052901	IMATINIB
606870192	IMATINIB
606870203	IMATINIB
668280030	IMATINIB
691890403	IMATINIB
000080100	INOTUZUMAB OZOGAMICIN
170890378	INTERFERON, GAMMA 1-B
422380111	INTERFERON, GAMMA 1-B
759870111	INTERFERON, GAMMA 1-B
641160011	INTERFERON, GAMMA 1-B
000032327	IPILIMUMAB
000032328	IPILIMUMAB
005902327	IPILIMUMAB
005902328	IPILIMUMAB
669142327	IPILIMUMAB
669142328	IPILIMUMAB
000091111	IRINOTECAN
000097529	IRINOTECAN

NDC Code	Generic Drug Name
001439701	IRINOTECAN
001439702	IRINOTECAN
167140725	IRINOTECAN
167140726	IRINOTECAN
231550179	IRINOTECAN
250210214	IRINOTECAN
473350937	IRINOTECAN
473350953	IRINOTECAN
531040151	IRINOTECAN
578843001	IRINOTECAN
578843002	IRINOTECAN
001439583	IRINOTECAN
007034432	IRINOTECAN
007034434	IRINOTECAN
150540043	IRINOTECAN
250210230	IRINOTECAN
459630614	IRINOTECAN
507420401	IRINOTECAN
507420402	IRINOTECAN
599230702	IRINOTECAN
617030349	IRINOTECAN
633230193	IRINOTECAN
667580048	IRINOTECAN
680010284	IRINOTECAN
691710398	IRINOTECAN, LIPOSOMAL
000151910	IXABEPILONE
000151911	IXABEPILONE
700201910	IXABEPILONE
700201911	IXABEPILONE
630200078	IXAZOMIB
630200079	IXAZOMIB
630200080	IXAZOMIB
150540060	LANREOTIDE
150540090	LANREOTIDE
150540120	LANREOTIDE
150541060	LANREOTIDE
150541090	LANREOTIDE
150541120	LANREOTIDE
000780671	LAPATINIB
001730752	LAPATINIB
595720402	LENALIDOMIDE
595720405	LENALIDOMIDE
595720410	LENALIDOMIDE
595720415	LENALIDOMIDE
595720420	LENALIDOMIDE
595720425	LENALIDOMIDE
628560708	LENVATINIB
628560710	LENVATINIB
628560714	LENVATINIB
628560718	LENVATINIB
628560720	LENVATINIB
628560724	LENVATINIB
000540269	LETROZOLE
000780249	LETROZOLE
000937620	LETROZOLE
003782071	LETROZOLE
006034180	LETROZOLE
167290034	LETROZOLE
245350801	LETROZOLE
247240030	LETROZOLE
422540243	LETROZOLE
519910759	LETROZOLE
548684151	LETROZOLE
548686252	LETROZOLE
551110646	LETROZOLE
578842021	LETROZOLE
605053255	LETROZOLE
621750888	LETROZOLE
627560511	LETROZOLE
633230772	LETROZOLE
658410744	LETROZOLE
683820363	LETROZOLE
422910373	LETROZOLE
638500025	LETROZOLE
163640034	LETROZOLE
004807620	LETROZOLE
621470237	LETROZOLE
691897620	LETROZOLE
001790169	LETROZOLE
005271712	LETROZOLE
422910374	LETROZOLE
680840803	LETROZOLE
000780909	LETROZOLE and RIBOCICLIB
000780916	LETROZOLE and RIBOCICLIB
000780923	LETROZOLE and RIBOCICLIB
000240222	LEUPROLIDE
000240605	LEUPROLIDE
000240610	LEUPROLIDE
000240793	LEUPROLIDE
000742108	LEUPROLIDE
000742282	LEUPROLIDE
000742440	LEUPROLIDE
000743346	LEUPROLIDE
000743473	LEUPROLIDE
000743641	LEUPROLIDE
000743642	LEUPROLIDE
000743663	LEUPROLIDE
000743683	LEUPROLIDE
000743779	LEUPROLIDE
000749694	LEUPROLIDE
001857400	LEUPROLIDE
007034014	LEUPROLIDE
007814003	LEUPROLIDE
473350936	LEUPROLIDE
416160936	LEUPROLIDE
521250736	LEUPROLIDE
629350222	LEUPROLIDE
629350223	LEUPROLIDE
629350302	LEUPROLIDE
629350303	LEUPROLIDE
629350452	LEUPROLIDE
629350453	LEUPROLIDE

NDC Code	Generic Drug Name
629350752	LEUPROLIDE
629350753	LEUPROLIDE
000153030	LOMUSTINE
000153031	LOMUSTINE
581813030	LOMUSTINE
581813031	LOMUSTINE
581813032	LOMUSTINE
581813040	LOMUSTINE
581813041	LOMUSTINE
581813042	LOMUSTINE
581813043	LOMUSTINE
000153032	LOMUSTINE
424270002	MECHLORETHAMINE
552920911	MECHLORETHAMINE
662150016	MECHLORETHAMINE
101390321	MELPHALAN
250210221	MELPHALAN
420230149	MELPHALAN
459630686	MELPHALAN
477810200	MELPHALAN
526090001	MELPHALAN
526093001	MELPHALAN
674570195	MELPHALAN
674570215	MELPHALAN
674570579	MELPHALAN
681520109	MELPHALAN
595720302	MELPHALAN
001730045	MELPHALAN
548684339	MELPHALAN
167290108	MITOMYCIN
167290115	MITOMYCIN
167290116	MITOMYCIN
167290246	MITOMYCIN
167290247	MITOMYCIN
167290248	MITOMYCIN
497710002	MITOMYCIN
553900251	MITOMYCIN
553900252	MITOMYCIN
553900253	MITOMYCIN
553900451	MITOMYCIN
553900452	MITOMYCIN
553900453	MITOMYCIN
694480001	MITOMYCIN
694480002	MITOMYCIN
694480003	MITOMYCIN
000153001	MITOMYCIN
000153002	MITOMYCIN
000153059	MITOMYCIN
163640116	MITOMYCIN
163640108	MITOMYCIN
163640115	MITOMYCIN
597650116	MITOMYCIN
597650108	MITOMYCIN
597650115	MITOMYCIN
000153080	MITOTANE
611260103	MITOTANE

NDC Code	Generic Drug Name
000690080	MITOXANTRONE
007034680	MITOXANTRONE
007034686	MITOXANTRONE
553900085	MITOXANTRONE
617030343	MITOXANTRONE
633230132	MITOXANTRONE
007034685	MITOXANTRONE
553900083	MITOXANTRONE
553900084	MITOXANTRONE
000027716	NECITUMUMAB
000074401	NELARABINE
000780683	NELARABINE
633790011	NELARABINE
704370240	NERATINIB
000780526	NILOTINIB
000780592	NILOTINIB
000881111	NILUTAMIDE
249870111	NILUTAMIDE
592120111	NILUTAMIDE
625590173	NILUTAMIDE
696560103	NIRAPARIB
000033772	NIVOLUMAB
000033774	NIVOLUMAB
005903772	NIVOLUMAB
005903774	NIVOLUMAB
621950611	NIVOLUMAB
621950610	NIVOLUMAB
502420070	OBINUTUZUMAB
000780646	OCTREOTIDE
000780647	OCTREOTIDE
000780648	OCTREOTIDE
000780811	OCTREOTIDE
000780818	OCTREOTIDE
000780825	OCTREOTIDE
000780669	OFATUMUMAB
000780690	OFATUMUMAB
001730821	OFATUMUMAB
001730808	OFATUMUMAB
633790023	OFATUMUMAB
003100657	OLAPARIB
003100668	OLAPARIB
003100679	OLAPARIB
634590177	OMACETAXINE
003101349	OSIMERTINIB
003101350	OSIMERTINIB
000240590	OXALIPLATIN
000240591	OXALIPLATIN
000690067	OXALIPLATIN
000690070	OXALIPLATIN
000690074	OXALIPLATIN
000691010	OXALIPLATIN
007033985	OXALIPLATIN
007033986	OXALIPLATIN
007813315	OXALIPLATIN
007813317	OXALIPLATIN
007819315	OXALIPLATIN

NDC Code	Generic Drug Name
007819317	OXALIPLATIN
009551725	OXALIPLATIN
009551727	OXALIPLATIN
009551731	OXALIPLATIN
009551733	OXALIPLATIN
125160592	OXALIPLATIN
250210211	OXALIPLATIN
250210212	OXALIPLATIN
250210233	OXALIPLATIN
459630611	OXALIPLATIN
473350046	OXALIPLATIN
473350047	OXALIPLATIN
473350176	OXALIPLATIN
473350178	OXALIPLATIN
572770001	OXALIPLATIN
572770002	OXALIPLATIN
605056132	OXALIPLATIN
617030361	OXALIPLATIN
617030362	OXALIPLATIN
617030363	OXALIPLATIN
633230211	OXALIPLATIN
633230212	OXALIPLATIN
633230650	OXALIPLATIN
633230750	OXALIPLATIN
671840508	OXALIPLATIN
671840509	OXALIPLATIN
671840510	OXALIPLATIN
674570442	OXALIPLATIN
674570468	OXALIPLATIN
674570469	OXALIPLATIN
674570476	OXALIPLATIN
680830176	OXALIPLATIN
680830177	OXALIPLATIN
680830314	OXALIPLATIN
633230175	OXALIPLATIN
633230176	OXALIPLATIN
667580053	OXALIPLATIN
000240597	OXALIPLATIN
000240596	OXALIPLATIN
473510006	OXALIPLATIN
181110005	OXALIPLATIN
181110011	OXALIPLATIN
473510057	OXALIPLATIN
473510007	OXALIPLATIN
578843051	OXALIPLATIN
578843052	OXALIPLATIN
128540549	OXALIPLATIN
128540551	OXALIPLATIN
671840502	OXALIPLATIN
671840501	OXALIPLATIN
680830271	OXALIPLATIN
680830272	OXALIPLATIN
540870363	OXALIPLATIN
416160176	OXALIPLATIN
416160178	OXALIPLATIN
167290332	OXALIPLATIN

NDC Code	Generic Drug Name
597650332	OXALIPLATIN
708600201	OXALIPLATIN
519910922	OXALIPLATIN
519910923	OXALIPLATIN
680830170	OXALIPLATIN
680830171	OXALIPLATIN
005171910	OXALIPLATIN
005171920	OXALIPLATIN
690970274	OXALIPLATIN
690970353	OXALIPLATIN
712880101	OXALIPLATIN
690970572	OXALIPLATIN
690970594	OXALIPLATIN
519910218	OXALIPLATIN
519910219	OXALIPLATIN
167140727	OXALIPLATIN
167140728	OXALIPLATIN
477810591	OXALIPLATIN
477810592	OXALIPLATIN
000690076	PACLITAXEL
000690078	PACLITAXEL
000690079	PACLITAXEL
007034764	PACLITAXEL
007034766	PACLITAXEL
007034767	PACLITAXEL
007034768	PACLITAXEL
250210213	PACLITAXEL
445670504	PACLITAXEL
445670505	PACLITAXEL
445670506	PACLITAXEL
459630613	PACLITAXEL
473510009	PACLITAXEL
553900114	PACLITAXEL
553900304	PACLITAXEL
553900314	PACLITAXEL
617030342	PACLITAXEL
633230763	PACLITAXEL
667580043	PACLITAXEL
674570434	PACLITAXEL
674570449	PACLITAXEL
674570471	PACLITAXEL
680830178	PACLITAXEL
680830179	PACLITAXEL
680830180	PACLITAXEL
708600200	PACLITAXEL
000153475	PACLITAXEL
000153476	PACLITAXEL
000153479	PACLITAXEL
001723754	PACLITAXEL
181110007	PACLITAXEL
528180001	PACLITAXEL
611260514	PACLITAXEL
611260515	PACLITAXEL
611260516	PACLITAXEL
528180002	PACLITAXEL
000444953	PACLITAXEL

NDC Code	Generic Drug Name
540870342	PACLITAXEL
519910936	PACLITAXEL
519910937	PACLITAXEL
519910938	PACLITAXEL
688170134	PACLITAXEL, PROTEIN-BOUND
000690187	PALBOCICLIB
000690188	PALBOCICLIB
000690189	PALBOCICLIB
635390189	PALBOCICLIB
538690187	PALBOCICLIB
538690188	PALBOCICLIB
538690189	PALBOCICLIB
555130954	PANITUMUMAB
555130955	PANITUMUMAB
555130956	PANITUMUMAB
000780650	PANOBINOSTAT
000780651	PANOBINOSTAT
000780652	PANOBINOSTAT
000780670	PAZOPANIB
001730804	PAZOPANIB
009443810	PEGASPARGASE
544820301	PEGASPARGASE
000063026	PEMBROLIZUMAB
000063029	PEMBROLIZUMAB
000027623	PEMETREXED
000027640	PEMETREXED
004090801	PENTOSTATIN
553900244	PENTOSTATIN
502420145	PERTUZUMAB
595720501	POMALIDOMIDE
595720502	POMALIDOMIDE
595720503	POMALIDOMIDE
595720504	POMALIDOMIDE
761890533	PONATINIB
761890534	PONATINIB
761890535	PONATINIB
488180001	PRALATREXATE
544820053	PROCARBAZINE
000027669	RAMUCIRUMAB
000027678	RAMUCIRUMAB
504190171	REGORAFENIB
000780860	RIBOCICLIB
000780867	RIBOCICLIB
000780874	RIBOCICLIB
502420051	RITUXIMAB
502420053	RITUXIMAB
502420108	RITUXIMAB and HYALURONIDASE
502420109	RITUXIMAB and HYALURONIDASE
460260983	ROMIDEPSIN
595720983	ROMIDEPSIN
595720984	ROMIDEPSIN
696600201	RUCAPARIB
696600202	RUCAPARIB
696600203	RUCAPARIB
508810005	RUXOLITINIB
508810010	RUXOLITINIB
508810015	RUXOLITINIB
508810020	RUXOLITINIB
508810025	RUXOLITINIB
578940420	SILTUXIMAB
578940421	SILTUXIMAB
302378900	SIPULEUCEL-T
000780645	SONIDEGIB
504190488	SORAFENIB
007034636	STREPTOZOCIN
000690550	SUNITINIB
000690770	SUNITINIB
000690830	SUNITINIB
000690980	SUNITINIB
555130078	TALIMOGENE LAHERPAREPVEC
555130079	TALIMOGENE LAHERPAREPVEC
000930784	TAMOXIFEN
001790224	TAMOXIFEN
001791952	TAMOXIFEN
003780144	TAMOXIFEN
003780274	TAMOXIFEN
005912233	TAMOXIFEN
005912472	TAMOXIFEN
005912473	TAMOXIFEN
136320123	TAMOXIFEN
548683004	TAMOXIFEN
548684287	TAMOXIFEN
636294413	TAMOXIFEN
637390269	TAMOXIFEN
680840924	TAMOXIFEN
680840935	TAMOXIFEN
000930782	TAMOXIFEN
518620446	TAMOXIFEN
518620447	TAMOXIFEN
518620449	TAMOXIFEN
518620450	TAMOXIFEN
604290909	TAMOXIFEN
604290910	TAMOXIFEN
000540320	TEMOZOLOMIDE
000540321	TEMOZOLOMIDE
000540322	TEMOZOLOMIDE
000540323	TEMOZOLOMIDE
000540324	TEMOZOLOMIDE
000540325	TEMOZOLOMIDE
000851366	TEMOZOLOMIDE
000851381	TEMOZOLOMIDE
000851417	TEMOZOLOMIDE
000851425	TEMOZOLOMIDE
000851430	TEMOZOLOMIDE
000851519	TEMOZOLOMIDE
000853004	TEMOZOLOMIDE
000937599	TEMOZOLOMIDE
000937600	TEMOZOLOMIDE
000937601	TEMOZOLOMIDE
000937602	TEMOZOLOMIDE
000937638	TEMOZOLOMIDE
000937639	TEMOZOLOMIDE

NDC Code	Generic Drug Name
003785260	TEMOZOLOMIDE
003785261	TEMOZOLOMIDE
003785262	TEMOZOLOMIDE
003785263	TEMOZOLOMIDE
003785264	TEMOZOLOMIDE
003785265	TEMOZOLOMIDE
005271777	TEMOZOLOMIDE
005271778	TEMOZOLOMIDE
005271779	TEMOZOLOMIDE
005271780	TEMOZOLOMIDE
005271781	TEMOZOLOMIDE
005271782	TEMOZOLOMIDE
007812691	TEMOZOLOMIDE
007812692	TEMOZOLOMIDE
007812693	TEMOZOLOMIDE
007812694	TEMOZOLOMIDE
007812695	TEMOZOLOMIDE
007812696	TEMOZOLOMIDE
167290048	TEMOZOLOMIDE
167290049	TEMOZOLOMIDE
167290050	TEMOZOLOMIDE
167290051	TEMOZOLOMIDE
167290129	TEMOZOLOMIDE
167290130	TEMOZOLOMIDE
400510604	TEMOZOLOMIDE
400510605	TEMOZOLOMIDE
400510606	TEMOZOLOMIDE
400510607	TEMOZOLOMIDE
400510608	TEMOZOLOMIDE
400510609	TEMOZOLOMIDE
439750252	TEMOZOLOMIDE
439750253	TEMOZOLOMIDE
439750254	TEMOZOLOMIDE
439750255	TEMOZOLOMIDE
439750256	TEMOZOLOMIDE
439750257	TEMOZOLOMIDE
473350890	TEMOZOLOMIDE
473350891	TEMOZOLOMIDE
473350892	TEMOZOLOMIDE
473350893	TEMOZOLOMIDE
473350929	TEMOZOLOMIDE
473350930	TEMOZOLOMIDE
502680761	TEMOZOLOMIDE
502680762	TEMOZOLOMIDE
502680763	TEMOZOLOMIDE
518620083	TEMOZOLOMIDE
518620084	TEMOZOLOMIDE
518620085	TEMOZOLOMIDE
518620086	TEMOZOLOMIDE
518620087	TEMOZOLOMIDE
518620088	TEMOZOLOMIDE
548684142	TEMOZOLOMIDE
548685348	TEMOZOLOMIDE
548685350	TEMOZOLOMIDE
548685354	TEMOZOLOMIDE
548685980	TEMOZOLOMIDE

NDC Code	Generic Drug Name
621750240	TEMOZOLOMIDE
621750241	TEMOZOLOMIDE
621750242	TEMOZOLOMIDE
621750243	TEMOZOLOMIDE
621750244	TEMOZOLOMIDE
621750245	TEMOZOLOMIDE
641440501	TEMOZOLOMIDE
641440502	TEMOZOLOMIDE
641440503	TEMOZOLOMIDE
641440504	TEMOZOLOMIDE
641440505	TEMOZOLOMIDE
641440506	TEMOZOLOMIDE
649800333	TEMOZOLOMIDE
649800334	TEMOZOLOMIDE
649800335	TEMOZOLOMIDE
649800336	TEMOZOLOMIDE
649800337	TEMOZOLOMIDE
649800338	TEMOZOLOMIDE
651620801	TEMOZOLOMIDE
651620802	TEMOZOLOMIDE
651620803	TEMOZOLOMIDE
651620804	TEMOZOLOMIDE
651620805	TEMOZOLOMIDE
651620806	TEMOZOLOMIDE
691897638	TEMOZOLOMIDE
678770537	TEMOZOLOMIDE
678770538	TEMOZOLOMIDE
678770539	TEMOZOLOMIDE
678770540	TEMOZOLOMIDE
678770541	TEMOZOLOMIDE
678770542	TEMOZOLOMIDE
683820751	TEMOZOLOMIDE
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683820753	TEMOZOLOMIDE
683820754	TEMOZOLOMIDE
683820755	TEMOZOLOMIDE
683820756	TEMOZOLOMIDE
427370101	TEMOZOLOMIDE
427370102	TEMOZOLOMIDE
427370103	TEMOZOLOMIDE
427370104	TEMOZOLOMIDE
427370105	TEMOZOLOMIDE
427370106	TEMOZOLOMIDE
163640048	TEMOZOLOMIDE
163640049	TEMOZOLOMIDE
163640050	TEMOZOLOMIDE
163640129	TEMOZOLOMIDE
163640130	TEMOZOLOMIDE
163640051	TEMOZOLOMIDE
707711095	TEMOZOLOMIDE
707711096	TEMOZOLOMIDE
707711097	TEMOZOLOMIDE
707711092	TEMOZOLOMIDE
707711093	TEMOZOLOMIDE
707711094	TEMOZOLOMIDE
000081179	TEMSIROLIMUS

NDC Code	Generic Drug Name
000153075	TENIPOSIDE
445670507	TENIPOSIDE
611260507	TENIPOSIDE
595720205	THALIDOMIDE
595720210	THALIDOMIDE
595720215	THALIDOMIDE
595720220	THALIDOMIDE
001730880	THIOGUANINE
763880880	THIOGUANINE
001439565	THIOTEPA
539640001	THIOTEPA
539640002	THIOTEPA
553900030	THIOTEPA
701211630	THIOTEPA
701211631	THIOTEPA
426050015	THIOTEPA
250210246	THIOTEPA
167290243	TOPOTECAN
163640243	TOPOTECAN
000074201	TOPOTECAN
000074205	TOPOTECAN
000074207	TOPOTECAN
000690075	TOPOTECAN
000780672	TOPOTECAN
000780673	TOPOTECAN
000780674	TOPOTECAN
004090302	TOPOTECAN
007034714	TOPOTECAN
167290151	TOPOTECAN
250210206	TOPOTECAN
250210236	TOPOTECAN
250210824	TOPOTECAN
459630615	TOPOTECAN
507420404	TOPOTECAN
553900370	TOPOTECAN
627560023	TOPOTECAN
633230762	TOPOTECAN
664350410	TOPOTECAN
667580051	TOPOTECAN
674570474	TOPOTECAN
113990005	TOREMIFENE
427470327	TOREMIFENE
000073260	TOSITUMOMAB
000073261	TOSITUMOMAB
000073262	TOSITUMOMAB
596760610	TRABECTEDIN
000780666	TRAMETINIB
000780668	TRAMETINIB
001730848	TRAMETINIB
001730849	TRAMETINIB
502420333	TRASTUZUMAB
502420134	TRASTUZUMAB
502420132	TRASTUZUMAB
648421020	TRIFLURIDINE/ TIPIRACIL
648421025	TRIFLURIDINE/ TIPIRACIL
000235902	TRIPTORELIN
000235904	TRIPTORELIN
000235906	TRIPTORELIN
525440154	TRIPTORELIN
525440156	TRIPTORELIN
525440092	TRIPTORELIN
525440153	TRIPTORELIN
525440188	TRIPTORELIN
525440189	TRIPTORELIN
243380150	TRIPTORELIN
679790001	VALRUBICIN
436240001	VALRUBICIN
003107810	VANDETANIB
003107820	VANDETANIB
003107830	VANDETANIB
003107840	VANDETANIB
584687820	VANDETANIB
584687840	VANDETANIB
502420090	VEMURAFENIB
000740561	VENETOCLAX
000740566	VENETOCLAX
000740576	VENETOCLAX
000740579	VENETOCLAX
553900091	VINBLASTINE
633230278	VINBLASTINE
007034402	VINCRISTINE
007034412	VINCRISTINE
617030309	VINCRISTINE
205360322	VINCRISTINE, LIPOSOMAL
000080045	VINORELBINE
000690099	VINORELBINE
000690103	VINORELBINE
000690205	VINORELBINE
007034182	VINORELBINE
007034183	VINORELBINE
250210204	VINORELBINE
459630607	VINORELBINE
553900069	VINORELBINE
553900070	VINORELBINE
578843003	VINORELBINE
617030341	VINORELBINE
643700210	VINORELBINE
643700250	VINORELBINE
643700532	VINORELBINE
667580045	VINORELBINE
674570431	VINORELBINE
674570479	VINORELBINE
674570481	VINORELBINE
674570482	VINORELBINE
502420140	VISMODEGIB
000060568	VORINOSTAT
000245840	ZIV-AFLIBERCEPT
000245841	ZIV-AFLIBERCEPT

Appendix D: Cancer Mapping – ICD-9 Codes

Cancer Type	Recon Eligible	ICD-9 Code
Acute Leukemia	Yes	204.0x 205.00 205.01 205.02 205.3x 206.0x 207.0x 207.2x 208.0x
Acute panmyelosis with myelofibrosis	No	no codes
Anal Cancer	Yes	154.2x 154.3x 154.8x
Atypical chronic myeloid leukemia, BCR/ABL negative	No	205.2x
Bladder Cancer	Yes	188.xx 189.1x 189.2x 189.3x 189.4x 189.8x 189.9x
Breast Cancer	Yes	174.xx 175.xx
Carcinoma in situ of breast	No	233.0x
Carcinoma in situ of cervix uteri	No	233.1x
Carcinoma in situ of middle ear and respiratory system	No	231.xx
Carcinoma in situ of oral cavity, esophagus and stomach	No	230.0x 230.1x 230.2x
Carcinoma in situ of other and unspecified digestive organs	No	230.3x 230.4x 230.5x 230.6x 230.7x 230.8x 230.9x
Carcinoma in situ of other and unspecified genital organs	No	233.2x 233.3x 233.4x 233.5x 233.6x
Carcinoma in situ of other and unspecified sites	No	233.7x 233.9x 234.xx
Carcinoma in situ of skin	No	232.xx
Chronic Leukemia	Yes	204.1x 205.1x
Chronic leukemia of unspecified cell type	No	208.1x
Chronic myelomonocytic leukemia	No	206.1x
CNS Tumor	Yes	191.xx 192.0x 192.1x 192.2x 192.3x 192.8x 192.9x
Endocrine Tumor	Yes	209.30 193.xx 194.0x 194.1x 194.3x 194.4x 194.5x 194.6x 194.8x 194.9x 209.0x 209.1x 209.2x
Essential (hemorrhagic) thrombocythemia	No	238.71
Female GU Cancer other than Ovary	Yes	179.xx 180.xx 182.xx 184.0x 184.1x 184.2x 184.3x 184.4x
Gastro/Esophageal Cancer	Yes	150.xx 151.xx
Head and Neck Cancer	Yes	140.xx 141.0x 141.1x 141.2x 141.3x 141.4x 141.5x 141.6x 141.8x 141.9x 142.0x 142.1x 142.2x 142.8x 142.9x 143.xx 144.xx 145.0x

Cancer Type	Recon Eligible	ICD-9 Code
Head and Neck Cancer (con't)	Yes	145.1x 145.2x 145.3x 145.4x 145.5x 145.6x 145.8x 145.9x 146.0x 146.1x 146.2x 146.3x 146.4x 146.5x 146.6x 146.7x 146.8x 146.9x 147.xx 148.0x 148.1x 148.2x 148.3x 148.8x 148.9x 149.xx 160.0x 160.1x 160.2x 160.3x 160.4x 160.5x 160.8x 160.9x 161.xx 162.0x 190.xx 195.0x
Juvenile myelomonocytic leukemia	No	no codes
Kaposi's sarcoma	No	176.xx
Kidney Cancer	Yes	189.0x
Leukemia, unspecified	No	208.2x 208.8x 208.9x
Liver Cancer	Yes	155.xx 156.0x 156.1x 156.2x 156.8x 156.9x
Lung Cancer	Yes	162.2x 162.3x 162.4x 162.5x
Lung Cancer (con't)	Yes	162.8x 162.9x 165.xx
Lymphoid Leukemia, unspecified	No	204.9x
Lymphoma	Yes	202.80 202.81 202.82 202.83 202.84 202.85 202.86 202.87 202.88 203.80 203.82 200.0x 200.1x 200.2x 200.3x 200.4x 200.5x 200.6x 200.7x 200.8x 201.xx 202.0x 202.1x 202.2x 202.4x 202.7x 273.3x
Malignant Melanoma	Yes	172.xx
Malignant neoplasm of abdomen	No	195.2x
Malignant neoplasm of bone and articular cartilage of limbs	No	170.4x 170.5x 170.7x 170.8x
Malignant neoplasm of bone and articular cartilage of other and unspecified sites	No	170.0x 170.1x 170.2x 170.3x 170.6x 170.9x
Malignant neoplasm of heart, mediastinum and pleura	No	163.xx 164.1x 164.2x 164.3x 164.8x 164.9x
Malignant neoplasm of lower limb	No	195.5x
Malignant neoplasm of other and ill-defined digestive organs	No	159.xx
Malignant neoplasm of other and unspecified female genital organs	No	183.2x 183.3x 183.4x

Cancer Type	Recon Eligible	ICD-9 Code
		183.5x 183.8x 183.9x 184.8x 184.9x
Malignant neoplasm of other specified ill-defined sites	No	195.8x
Malignant neoplasm of pelvis	No	195.3x
Malignant neoplasm of penis, other, and unspecific male organs	No	187.1x 187.2x 187.3x 187.4x 187.5x 187.6x 187.7x 187.8x 187.9x
Malignant neoplasm of peripheral nerves, autonomic nervous system, and other and connective soft tissue	No	171.0x 171.2x 171.3x 171.4x 171.5x 171.6x 171.7x 171.8x 171.9x
Malignant neoplasm of placenta	No	181.xx
Malignant neoplasm of retroperitoneum and peritoneum	No	158.xx
Malignant neoplasm of testis	No	186.xx
Malignant neoplasm of thorax	No	195.1x
Malignant neoplasm of thymus	No	164.0x
Malignant neoplasm of upper limb	No	195.4x
Malignant neoplasm without specification of site	No	199.xx
MDS	Yes	238.72 238.73 238.74 238.75
Melanoma in situ	No	no codes
Merkel cell carcinoma	No	209.31 209.32 209.33 209.34 209.35 209.36
Monocytic Leukemia, unspecified	No	206.2x 206.9x
Multiple Myeloma	Yes	203.81 203.0x 203.1x
Myelofibrosis	No	289.83
Myeloid leukemia, unspecified	No	205.9x
Osteomyelofibrosis	No	238.76
		289.89
Other and unspecified malignant neoplasm of skin	No	173.xx
Other and unspecified malignant neoplasms of lymphoid, hematopoietic and related tissue	No	202.3x 202.5x 202.6x 202.9x
Other lymphoid leukemia	No	204.2x 204.8x
Other monocytic leukemia	No	206.8x
Other myeloid leukemia	No	205.8x
Other specified leukemias	No	207.8x
Ovarian Cancer	Yes	183.0x
Pancreatic Cancer	Yes	157.xx
Polycythemia vera	No	207.10 207.11 207.12 238.4x
Prostate Cancer	Yes	185.xx
Secondary and unspecified malignant neoplasm of lymph nodes	No	196.xx
Secondary malignant neoplasm of other and unspecified sites	No	198.xx
Secondary malignant neoplasm of respiratory and digestive organs	No	197.xx
Secondary neuroendocrine tumors	No	209.7x
Small Intestine / Colorectal Cancer	Yes	152.xx 153.xx 154.0x 154.1x

Appendix E: Cancer Mapping – ICD-10 Code

Cancer Type	Recon Eligible	ICD-10 Code
Acute Leukemia	Yes	C91.0x C91.3x C91.5x C91.6x C91.ax C92.0x C92.3x C92.4x C92.5x C92.6x C92.ax C93.0x C94.0x C94.2x C94.3x C95.0x
Acute panmyelosis with myelofibrosis	No	C94.4x
Anal Cancer	Yes	C21.xx
Atypical chronic myeloid leukemia, BCR/ABL negative	No	C92.2x
Bladder Cancer	Yes	C65.xx C66.xx C67.xx C68.xx C50.xx
Carcinoma in situ of breast	No	D05.xx
Carcinoma in situ of cervix uteri	No	D06.xx
Carcinoma in situ of middle ear and respiratory system	No	D02.xx
Carcinoma in situ of oral cavity, esophagus and stomach	No	D00.xx
Carcinoma in situ of other and unspecified digestive organs	No	D01.xx D07.xx
Carcinoma in situ of other and unspecified sites	No	D09.xx
Carcinoma in situ of skin	No	D04.xx
Chronic Leukemia	Yes	C91.1x C92.1x
Chronic leukemia of unspecified cell type	No	C95.1x
Chronic myelomonocytic leukemia	No	C93.1x
Chronic myeloproliferative disease	No	D47.1x
CNS Tumor	Yes	C70.xx C71.xx C72.xx
Endocrine Tumor	Yes	C73.xx C74.xx C75.xx C7A.xx
Essential (hemorrhagic) thrombocythemia	No	D47.3x
Female GU Cancer other than Ovary	Yes	C51.xx C52.xx C53.xx C54.xx C55.xx
Gastro/Esophageal Cancer	Yes	C15.xx C16.xx
Head and Neck Cancer	Yes	C00.xx C01.xx C02.xx C03.xx C04.xx C05.xx C06.xx C07.xx C08.xx C09.xx C10.xx C11.xx C12.xx C13.xx C14.xx C30.xx C31.xx C32.xx C33.xx C69.xx C76.0x
Juvenile myelomonocytic leukemia	No	C93.3x
Kaposi's sarcoma	No	C46.xx
Kidney Cancer	Yes	C64.xx
Leukemia, unspecified	No	C95.9x
Liver Cancer	Yes	C22.xx C23.xx C24.xx
Lung Cancer	Yes	C34.xx C39.xx C45.xx
Lymphoid Leukemia, unspecified	No	C91.9x
Lymphoma	Yes	C81.xx C82.xx C83.xx C84.xx C85.xx C86.xx C88.xx C91.4x
Malignant Melanoma	Yes	C43.xx
Malignant neoplasm of abdomen	No	C76.2x
Malignant neoplasm of bone and articular cartilage of limbs	No	C40.xx

Cancer Type	Recon Eligible	ICD-10 Code
Malignant neoplasm of bone and articular cartilage of other and unspecified sites	No	C41.xx
Malignant neoplasm of heart, mediastinum and pleura	No	C38.xx
Malignant neoplasm of lower limb	No	C76.5x
Malignant neoplasm of other and ill-defined digestive organs	No	C26.xx
Malignant neoplasm of other and unspecified female genital organs	No	C57.xx
Malignant neoplasm of other specified ill-defined sites	No	C76.8x
Malignant neoplasm of pelvis	No	C76.3x
Malignant neoplasm of penis, other, and unspecific male organs	No	C60.xx C63.xx
Malignant neoplasm of peripheral nerves, autonomic nervous system, and other and connective soft tissue	No	C47.xx C49.xx
Malignant neoplasm of placenta	No	C58.xx
Malignant neoplasm of retroperitoneum and peritoneum	No	C48.xx
Malignant neoplasm of testis	No	C62.xx
Malignant neoplasm of thorax	No	C76.1x
Malignant neoplasm of thymus	No	C37.xx
Malignant neoplasm of upper limb	No	C76.4x
Malignant neoplasm without specification of site	No	C80.xx
MDS	Yes	C94.6x D46.xx
Melanoma in situ	No	D03.xx
Merkel cell carcinoma	No	C4A.xx
Monocytic Leukemia, unspecified	No	C93.9x
Multiple Myeloma	Yes	C90.xx
Myelofibrosis	No	D75.81
Myeloid leukemia, unspecified	No	C92.9x
Osteomyelofibrosis	No	D47.4x
Other and unspecified malignant neoplasm of skin	No	C44.xx
Other and unspecified malignant neoplasms of lymphoid, hematopoietic and related tissue	No	C96.xx
Other lymphoid leukemia	No	C91.zx
Other monocytic leukemia	No	C93.zx
Other myeloid leukemia	No	C92.zx
Other specified leukemias	No	C94.8x
Ovarian Cancer	Yes	C56.xx
Pancreatic Cancer	Yes	C25.xx
Polycythemia vera	No	D45.xx
Prostate Cancer	Yes	C61.xx
Secondary and unspecified malignant neoplasm of lymph nodes	No	C77.xx
Secondary malignant neoplasm of other and unspecified sites	No	C79.xx
Secondary malignant neoplasm of respiratory and digestive organs	No	C78.xx
Secondary neuroendocrine tumors	No	C7B.xx
Small Intestine / Colorectal Cancer	Yes	C17.xx C18.xx C19.xx C20.xx

Appendix F: Castration-Sensitive Prostate Cancer Drug Codes

Code Type	Code	Generic Drug Name
HCPCS	J9155	DEGARELIX
HCPCS	J9202	GOSERELIN
HCPCS	J1675	HISTRELIN
HCPCS	J9225	HISTRELIN
HCPCS	J1950	LEUPROLIDE
HCPCS	J9217	LEUPROLIDE
HCPCS	J9218	LEUPROLIDE
HCPCS	J9219	LEUPROLIDE
HCPCS	C9016	TRIPTORELIN
HCPCS	J3315	TRIPTORELIN
NDC	000930220	BICALUTAMIDE
NDC	003100705	BICALUTAMIDE
NDC	003787017	BICALUTAMIDE
NDC	007815409	BICALUTAMIDE
NDC	009046019	BICALUTAMIDE
NDC	167140571	BICALUTAMIDE
NDC	167290023	BICALUTAMIDE
NDC	416160485	BICALUTAMIDE
NDC	510790692	BICALUTAMIDE
NDC	519910560	BICALUTAMIDE
NDC	521250709	BICALUTAMIDE
NDC	548684503	BICALUTAMIDE
NDC	548686133	BICALUTAMIDE
NDC	604290226	BICALUTAMIDE
NDC	605052642	BICALUTAMIDE
NDC	636720005	BICALUTAMIDE
NDC	658410613	BICALUTAMIDE
NDC	672530191	BICALUTAMIDE
NDC	680840374	BICALUTAMIDE
NDC	680840612	BICALUTAMIDE
NDC	683820224	BICALUTAMIDE
NDC	621750132	BICALUTAMIDE
NDC	163640023	BICALUTAMIDE
NDC	163640091	BICALUTAMIDE
NDC	605053542	BICALUTAMIDE
NDC	422910168	BICALUTAMIDE
NDC	473350485	BICALUTAMIDE
NDC	604290177	BICALUTAMIDE
NDC	636295321	BICALUTAMIDE
NDC	691890298	BICALUTAMIDE
NDC	555668301	DEGARELIX
NDC	555668303	DEGARELIX
NDC	555668401	DEGARELIX
NDC	555668403	DEGARELIX
NDC	001724960	FLUTAMIDE
NDC	005912466	FLUTAMIDE
NDC	498840753	FLUTAMIDE
NDC	604290272	FLUTAMIDE
NDC	690970915	FLUTAMIDE
NDC	001851125	FLUTAMIDE
NDC	000850525	FLUTAMIDE
NDC	555670150	FLUTAMIDE
NDC	005550870	FLUTAMIDE
NDC	548684628	FLUTAMIDE
NDC	003100950	GOSERELIN
NDC	003100951	GOSERELIN
NDC	679790500	HISTRELIN
NDC	000240222	LEUPROLIDE
NDC	000240605	LEUPROLIDE
NDC	000240610	LEUPROLIDE
NDC	000240793	LEUPROLIDE
NDC	000742108	LEUPROLIDE
NDC	000742282	LEUPROLIDE
NDC	000742440	LEUPROLIDE
NDC	000743346	LEUPROLIDE
NDC	000743473	LEUPROLIDE
NDC	000743641	LEUPROLIDE
NDC	000743642	LEUPROLIDE
NDC	000743663	LEUPROLIDE
NDC	000743683	LEUPROLIDE
NDC	000743779	LEUPROLIDE
NDC	000749694	LEUPROLIDE
NDC	001857400	LEUPROLIDE
NDC	007034014	LEUPROLIDE
NDC	007814003	LEUPROLIDE
NDC	416160936	LEUPROLIDE
NDC	473350936	LEUPROLIDE
NDC	521250736	LEUPROLIDE
NDC	629350222	LEUPROLIDE
NDC	629350223	LEUPROLIDE
NDC	629350302	LEUPROLIDE
NDC	629350303	LEUPROLIDE
NDC	629350452	LEUPROLIDE
NDC	629350453	LEUPROLIDE
NDC	629350752	LEUPROLIDE
NDC	629350753	LEUPROLIDE
NDC	000881111	NILUTAMIDE
NDC	249870111	NILUTAMIDE
NDC	592120111	NILUTAMIDE
NDC	625590173	NILUTAMIDE
NDC	000235902	TRIPTORELIN
NDC	000235904	TRIPTORELIN
NDC	000235906	TRIPTORELIN
NDC	525440154	TRIPTORELIN
NDC	525440156	TRIPTORELIN
NDC	525440092	TRIPTORELIN
NDC	525440153	TRIPTORELIN
NDC	525440188	TRIPTORELIN
NDC	525440189	TRIPTORELIN
NDC	243380150	TRIPTORELIN

Appendix G: Low-Risk Bladder Cancer Drug Codes

Code Type	Code	Generic Drug Name
HCPCS	J9031	BCG (INTRAVESICAL) PER INSTILLATION
HCPCS	J9280	MITOMYCIN
HCPCS	J9290	MITOMYCIN
HCPCS	J9291	MITOMYCIN
NDC	000520602	BCG (BACILLUS CALMETTE-GUERIN) LIVE VAX, intravesical
NDC	492810880	BCG LIVE VAX, intravesical
NDC	167290108	MITOMYCIN
NDC	167290115	MITOMYCIN
NDC	167290116	MITOMYCIN
NDC	167290246	MITOMYCIN
NDC	167290247	MITOMYCIN
NDC	167290248	MITOMYCIN
NDC	497710002	MITOMYCIN
NDC	553900251	MITOMYCIN
NDC	553900252	MITOMYCIN
NDC	553900253	MITOMYCIN
NDC	553900451	MITOMYCIN
NDC	553900452	MITOMYCIN
NDC	553900453	MITOMYCIN
NDC	694480001	MITOMYCIN
NDC	694480002	MITOMYCIN
NDC	694480003	MITOMYCIN
NDC	000153001	MITOMYCIN
NDC	000153002	MITOMYCIN
NDC	000153059	MITOMYCIN
NDC	163640116	MITOMYCIN
NDC	163640108	MITOMYCIN
NDC	163640115	MITOMYCIN
NDC	597650116	MITOMYCIN
NDC	597650108	MITOMYCIN
NDC	597650115	MITOMYCIN

Appendix H: Low-Risk Breast Cancer NDC Codes

NDC Code	Generic Drug Name
000540164	ANASTROZOLE
000937536	ANASTROZOLE
001790068	ANASTROZOLE
003100201	ANASTROZOLE
003786034	ANASTROZOLE
007815356	ANASTROZOLE
009046195	ANASTROZOLE
009046229	ANASTROZOLE
165710421	ANASTROZOLE
167290035	ANASTROZOLE
216950990	ANASTROZOLE
420430180	ANASTROZOLE
422540161	ANASTROZOLE
430630383	ANASTROZOLE
510790323	ANASTROZOLE
516550638	ANASTROZOLE
519910620	ANASTROZOLE
545696198	ANASTROZOLE
500901193	ANASTROZOLE
500901918	ANASTROZOLE
500902005	ANASTROZOLE
500902118	ANASTROZOLE
500902453	ANASTROZOLE
548685000	ANASTROZOLE
548686130	ANASTROZOLE
551110647	ANASTROZOLE
602580866	ANASTROZOLE
604290286	ANASTROZOLE
605052985	ANASTROZOLE
606870112	ANASTROZOLE
607630376	ANASTROZOLE
621750710	ANASTROZOLE
627560250	ANASTROZOLE
631870080	ANASTROZOLE
633230129	ANASTROZOLE
636295269	ANASTROZOLE
636720015	ANASTROZOLE
658410743	ANASTROZOLE
663360533	ANASTROZOLE
664350415	ANASTROZOLE
678770171	ANASTROZOLE
680010155	ANASTROZOLE
680840448	ANASTROZOLE
683820209	ANASTROZOLE
691890035	ANASTROZOLE
620330376	ANASTROZOLE
422910105	ANASTROZOLE
001151261	ANASTROZOLE
638500010	ANASTROZOLE
163640035	ANASTROZOLE
687886774	ANASTROZOLE
680711682	ANASTROZOLE
000097663	EXEMESTANE
000540080	EXEMESTANE
003785001	EXEMESTANE
477810108	EXEMESTANE
548685261	EXEMESTANE
597622858	EXEMESTANE
606870132	EXEMESTANE
108297663	EXEMESTANE
108292858	EXEMESTANE
008320595	EXEMESTANE
000540269	LETROZOLE
000780249	LETROZOLE
000937620	LETROZOLE
003782071	LETROZOLE
006034180	LETROZOLE
167290034	LETROZOLE
245350801	LETROZOLE
247240030	LETROZOLE
422540243	LETROZOLE
519910759	LETROZOLE
548684151	LETROZOLE
548686252	LETROZOLE
551110646	LETROZOLE
578842021	LETROZOLE
605053255	LETROZOLE
621750888	LETROZOLE
627560511	LETROZOLE
633230772	LETROZOLE
658410744	LETROZOLE
683820363	LETROZOLE
422910373	LETROZOLE
638500025	LETROZOLE
163640034	LETROZOLE
004807620	LETROZOLE
621470237	LETROZOLE
691897620	LETROZOLE
001790169	LETROZOLE
005271712	LETROZOLE
422910374	LETROZOLE
680840803	LETROZOLE
000930784	TAMOXIFEN
001790224	TAMOXIFEN
001791952	TAMOXIFEN
003780144	TAMOXIFEN
003780274	TAMOXIFEN
005912233	TAMOXIFEN
005912472	TAMOXIFEN
005912473	TAMOXIFEN
136320123	TAMOXIFEN
548683004	TAMOXIFEN
548684287	TAMOXIFEN
636294413	TAMOXIFEN
637390269	TAMOXIFEN
680840924	TAMOXIFEN
680840935	TAMOXIFEN
000930782	TAMOXIFEN
518620446	TAMOXIFEN
518620447	TAMOXIFEN
518620449	TAMOXIFEN
518620450	TAMOXIFEN
604290909	TAMOXIFEN
604290910	TAMOXIFEN

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CONTACT

Robert Bachler
rob.bachler@milliman.com

Nicholas Johnson
nick.johnson@milliman.com

Pamela Pelizzari
pamela.pelizzarir@milliman.com

L. Daniel Muldoon
daniel.muldoon@milliman.com