Uncertainty in Risk Adjustment

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Acknowledgments

The focus of this research is to present a methodology for quantifying uncertainty in risk scores as output from risk assessment models. We would greatly appreciate feedback from and discussion among risk adjustment practitioners. We hope that, through discussion and exchange of ideas, best practices would emerge regarding recognition of uncertainty in risk adjustment.

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Executive summary

The practice of risk adjustment has long carried significance for Medicare Advantage, Medicaid managed care, and commercial health insurance plans. With national healthcare reform, especially in the areas of health insurance exchanges and provider payment reforms, many more stakeholders are hoping to better understand implications of risk adjustment. No longer the realm of specialists, risk adjustment now concerns most practicing healthcare actuaries who will be interested in a refinement in the art and science of risk adjustment.

The accuracy of risk adjustment as measured by statistics such as R-Squared, mean absolute prediction error (MAPE), and predictive ratio has been well studied (Winkelman & Mehmud, 2007). However, existing literature has been focusing on a risk score as a point estimate. This report aims to expand our understanding by providing a methodology to quantify uncertainty in risk assessment. Uncertainty in the context of risk assessment is due to the fact that predictions are not perfect. These predictions, or risk scores, can be at the individual level or averaged over a group such as a health plan or a provider panel. In practice, risk adjustment typically concerns group-level relativities in risk scores. The table in Figure 1 shows a simplified example of a risk adjustment calculation. Cells that are affected by uncertainty in risk score estimates are highlighted in yellow.

Figure 1: Illustrative Example of a Risk Adjustment Calculation for Two Health Plans

	Member Months	Projected Expense	Average Risk	Risk Adjusted	Average Risk (90% CI)	Expected Expense (90% CI)
Plan A	5,000		1.03	$463.50*	{0.988 - 1.076}	{$445 - $484}
Plan B	5,000		0.97	$436.50	{0.928 - 1.016}	{$418 - $457}
Total	10,000	$450.00	1.00	$450.00		

* $450 x 1.03 = $463.50

Here we show two hypothetical health plans, A and B, with identical member months. We assume that the projected per member per month (PMPM) healthcare expense for both plans is $450. The two plans attract different members and therefore have different risk scores and risk-adjusted expenses. Because of uncertainties in risk adjustment, the risk scores and expected expenses should be viewed as point estimates within confidence intervals. The concepts and methodologies developed in this paper allow a practitioner to calculate the cells highlighted in blue. These cells show the range of the 90% confidence

intervals for the estimated risk and the risk adjusted expense.[4]Risk adjustment moves money around. As such, of the many functions that actuaries perform, risk adjustment is expected to be highly scrutinized. As the practice matures the questions from stakeholders are going to increase in number and in complexity. We studied the following questions as part of this research:

1. When is a difference in risk scores statistically significant?
2. How confident can we be that the predictions from a risk assessment model will be close to the actual values?
3. How does the predictive accuracy of a risk assessment model affect uncertainty around the prediction?
4. What are the sources of uncertainty in risk scores?

The key conclusions are described in the paragraphs below. Please note that claim data for Medicare fee-for-service (FFS) beneficiaries were used in this research, along with the prospective Centers for Medicare and Medicaid Services hierarchical condition categories (CMS-HCC) risk adjustment model. Both the data and the model are described further in this report (Appendix D). Note that the methods and tools developed as part of this research are not limited by the data, model, or methodology (prospective or concurrent) of a risk adjustment application.

At this point it is important to emphasize that quantifying uncertainty *does not* undermine the value in a sound application of risk adjustment. In fact, the research aims to strengthen the foundations of the concept, providing new tools for greater rigor in its application, and therefore enabling more success in meeting the policy goals of risk adjustment.

Question 1: When is a difference in risk scores statistically significant?

Are differences in risk scores statistically significant enough to justify budget movements? This question is relevant when drawing inferences from a sample and not the entire population. As such, the question is not pertinent to most applications of risk adjustment where the entire population is used for risk scoring. However, situations may arise in which the individuals in the data used to determine a risk score for a health plan are not representative of the population to which an adjustment is applied to[5]. The

[4] This statement is simplified, and there are associated statistical nuances that are described further in Section 1.1
[5] For example, a fast-growing health plan where year 1 data for only a fraction of year 2 individuals was used to determine the average risk score—effectively constituting a sample.

table in Figure 2 shows the minimum difference in risk score that is required to be statistically significant. We can see that the minimum difference required decreases by group size. Note, however, that even in groups of 5,000 the minimum difference required is fairly significant, at 3%-4%.[6] For example, if we have two groups of 5,000 members each, an observed difference in their risk scores is statistically significant at the 0.1 (90%) significance level only if that difference is greater than 0.027. Figure 2 also shows that differences in risk scores are likely to not be statistically significant when comparing groups with 50 lives (i.e., the difference needs to be greater than about 0.3 in order to be significant and this can be a relatively high threshold to cross in practice).[7]

Figure 2: Minimum Difference in Risk Scores Required for Statistical Significance

# of Members		Min. Diff. for Sig.	
Group 1	**Group 2**	**90%**	**95%**
50	50	0.2811	0.3370
250	250	0.1229	0.1467
1,000	1,000	0.0611	0.0728
5,000	5,000	0.0273	0.0326

The materiality of the minimum difference required to justify risk adjustment is an important result where risk scores are based on a sample drawn from a population and risk adjustment applies to the entire population. The mechanics of running statistical significance testing are simple, facilitating its use. Further details are presented in Section 2.3.1.

Question 2: What is the size of the prediction error at various group sizes?

In this report we provide a methodology to calculate confidence intervals empirically. This methodology applies to individuals and groups, and is independent of the risk assessment model that is used. The table in Figure 3 shows the empirical 90% confidence interval (90% CI) for groups of size one (i.e., individual) to 5,000 individuals. The confidence interval values shown throughout this report are provided as *adjustments* to the risk scores (i.e., +/- adjustments). For example, if the individual risk score is 2.00, the 90% CI from Figure 3 is {2.00 – 1.6 = **0.4**, 2.00 + 2.81 = **4.81**}

[6] On a normalized basis (i.e., average risk score is 1.00).
[7] Examples where statistical significance at low group sizes may be relevant include: provider profiling or provider-level risk adjustment where the sample size of patients/members may be small, and differentiating small-groups.

Section 2 and Appendix F include detailed exhibits for confidence intervals by varying practical constraints (e.g. turnover, partial eligibility, data lag, and data quality) on the predicted risk scores, and highlighting the impact of interesting statistical properties such as heteroskedasticity of risk scores and non-random grouping of individuals.

Figure 3: 90% Confidence Intervals by Group Size

Medicare 5% Sample and CMS-HCC Model

Group Size	Confidence Interval
1	Score + {-1.6,2.81}*
2	Score + {-1.25,2.21}
5	Score + {-0.89,1.51}
25	Score + {-0.49,0.69}
50	Score + {-0.37,0.49}
250	Score + {-0.19,0.21}
1,000	Score + {-0.097,0.1}
5,000	Score + {-0.042,0.046}
10,000**	Score + {-0.033,0.038}
25,000**	Score + {-0.022,0.023}
50,000**	Score + {-0.016,0.016}
100,000**	Score + {-0.012,0.011}

* The large negative adjustment for an individual risk score is due to skewed distribution of the error term, and that a score plus an adjustment will be bounded by zero (i.e., a negative risk score does not make sense in reality). Note that the lower bound may not be exactly zero in a prospective model, where members are usually assigned a demographic score. For instance, the lower bound (for an individual) in this case may be the demographic-only risk score. In a concurrent model, the lower bound may be closer to zero.

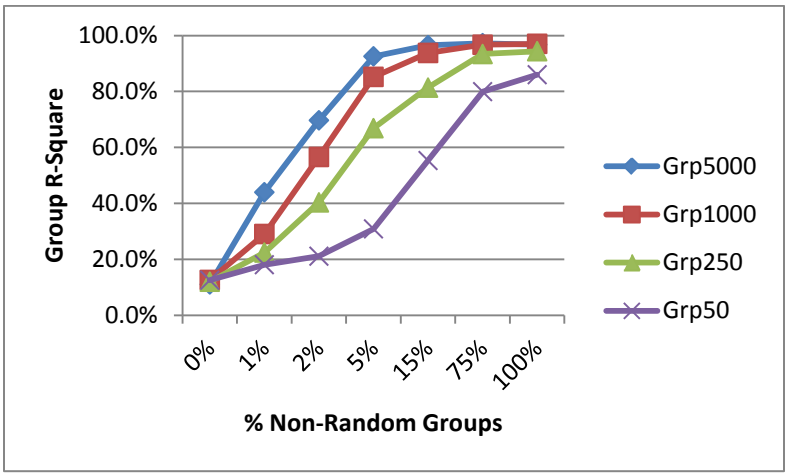
** The confidence intervals for group sizes 10,000 and higher are extrapolated by fitting the data for groups of size one to 5,000 using a power-law equation. While uncertainty in risk scores for small groups of Medicare beneficiaries is important (e.g. with ACOs), we also need to know the uncertainty in risk score for very large groups such as insurers covering 100,000 lives in a state. While available data and resources did not afford running simulations feasibly for groups of greater than 5,000 in this project, the power-law fits the data well and can be a useful extrapolation tool for such results. More details on this extrapolation are provided in Section 2.3.3.

As shown in Figure 3, the confidence intervals are asymmetric, owing to the asymmetric distributions of healthcare costs, and shrink by increasing group size as both the actual and predicted values get closer to 1.00.

Question 3: How does accuracy and uncertainty change by group size?

Group R-Squared is a commonly used metric to evaluate group-level accuracy for risk adjustment models. A limitation of the data used in this study is that it is de-identified and does not contain actual grouping information of the individual.[8] One approach would be to form groups of various sizes randomly and calculate the R-Squared and confidence intervals by random groups, such as earlier research by Ellis and Yi.[9] In reality, groups—either employer groups or provider groups—are not randomly formed. To draw more meaningful inferences, we took a hybrid approach by blending in a certain percentage of non-random groups in the bootstrapping simulations, where the non-random groups are determined by risk score bands (see Section 2.1.1). The results are illustrated in the chart in Figure 4. Overall, we find that only a small amount of non-randomness is needed in order for the group R-Squared to increase significantly, and larger group sizes have a steeper increase than smaller group sizes. We expect that when real grouping is used, the group R-Squared will be quite high.[10]

Figure 4: R-Squared vs. Percentage of Groups Created Non-Randomly



We find that calculated confidence intervals are resilient to changes in group R-Squared, and in fact slightly expand when group R-Squared is high. A more in-depth discussion of this property is presented

[8] The data used is for a Medicare FFS population, whereas groupings are more meaningful in data for a commercial population.

[9] Ellis, R., Yi, R. et al. (August 2003). Applying diagnosis-based predictive models to group underwriting. *Health Section News* No. 46. Retrieved May 15, 2012, from http://cms-staging.soa.org/library/newsletters/health-section-news/2003/august/hsn-2003-iss46-elliskramer.aspx.

[10] There is a lot of anecdotal evidence among practitioners for high R-Squared for actual groups (vs. the low individual-level R-Squared results that are most commonly cited). It is satisfying to experimentally confirm the relationship of the R-Squared statistic to non-random grouping.

in Section 2.3.3. In summary, what is responsible for the increase in accuracy, i.e., the variation in actual cost, also leads to an increase in the spread of the error term, thus increasing the width of calculated confidence intervals. Note that this does not undermine the value of higher accuracy, as illustrated in Appendix C.

Question 4: What are the other sources of uncertainty in risk scores?

In practice, uncertainty in risk scores does not accrue solely from the quality of the risk assessment model that is used. It may also come from the data used as input into the model. For instance, the CMS-HCC model, as well as many other risk assessment models, was developed using a calendar year of fully run-out data to predict cost for the next year. In practice there are several constraints that do not allow an application of the model that is consistent with its development, and potentially this could lower accuracy and introduce bias in the predictions. Such practical constraints include:

- **Claim and administrative lag:** Healthcare claim lag is usually at least three months. The period can increase because of time needed to aggregate, edit, and validate the data and to run analytics (and other administrative/resources constraints).
- **Member turnover:** There may be new members in the effective period for which a risk score cannot be assessed.
- **Partial eligibility:** Members may not be eligible for the full year for which claims are run through the model.
- **Data quality:** Claim data varies in quality. Diagnoses codes may not be complete or reliable.

The accuracy, bias, and confidence interval metrics for these issues are summarized in the table in Figure 5. While individual R-Squared results vary significantly by input data quality, the confidence intervals are quite stable within a specified group size.

Confidence intervals are related to the variance of the error term,[11] which can be expressed as:

$$Var(\text{Actual-Predicted}) = Var(\text{Actual}) + Var(\text{Predicted}) - 2 \times Cov(\text{Actual, Predicted})$$

We calculated the variance of the predicted and actual costs for the study population and found that the variance in actual cost (i.e., *Var*[Actual]) is over six times the variance in predicted risk and therefore is

[11] The difference of actual and predicted cost.

by far the dominant contributor to the total variance of the error term.[12] This is the reason why even when the R-Squared changes (i.e., prediction quality changes) the confidence intervals remain relatively unaffected. This can be observed in Figure 5, wherein the width of confidence intervals are dependent upon group size, and not as impacted by changes in the accuracy of various applications of a risk assessment model as measured by the R-Squared statistic.

Figure 5: 90% Confidence Interval* by Various Models and Group Size

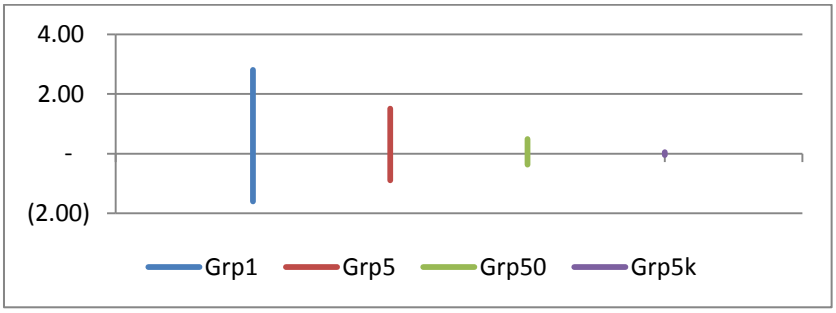
Input Data	Individual R-Sq	Grp: 1	Grp: 5	Grp: 50	Grp: 5,000
1: Demo Only**	0.5%	{-1.09,3.23}	{-0.82,1.65}	{-0.39,0.53}	{-0.047,0.048}
2: Standard***	12.3%	{-1.6,2.81}	{-0.89,1.51}	{-0.37,0.49}	{-0.042,0.046}
3: Lag-1Q†	10.2%	{-1.62,2.86}	{-0.91,1.53}	{-0.38,0.51}	{-0.044,0.046}
4: Lag-2Q	8.9%	{-1.63,2.88}	{-0.92,1.53}	{-0.38,0.51}	{-0.046,0.046}
5: Elig-9Mo††	12.3%	{-1.56,2.82}	{-0.88,1.49}	{-0.37,0.51}	{-0.044,0.046}
6: Elig-6Mo	12.1%	{-1.52,2.83}	{-0.87,1.49}	{-0.38,0.49}	{-0.043,0.045}
7: Elig-3Mo	11.6%	{-1.46,2.87}	{-0.86,1.52}	{-0.37,0.51}	{-0.044,0.045}
8: Turnover-10%	11.0%	{-1.53,2.84}	{-0.88,1.51}	{-0.37,0.5}	{-0.044,0.046}
9: Turnover-30%	9.0%	{-1.37,2.95}	{-0.87,1.56}	{-0.38,0.51}	{-0.045,0.047}
10: Quality-Inp†††	12.3%	{-1.6,2.8}	{-0.89,1.5}	{-0.38,0.49}	{-0.043,0.046}
11: Quality-Out	12.3%	{-1.6,2.81}	{-0.89,1.49}	{-0.38,0.5}	{-0.044,0.045}
12: Quality-Prof	9.0%	{-1.43,2.92}	{-0.86,1.55}	{-0.38,0.5}	{-0.045,0.046}

* Expressed as adjustments, i.e., CI = MAX(calculated score + {lower bound adj., upper bound adj.},0).
** Demographic only prediction. Other predictions are described in Section 3.1.
*** Using a standard application of the CMS-HCC model.
† Incorporating one-quarter (1Q) or two-quarters (2Q) lag between the experience and prediction periods.
†† Consideration of partially eligible members (e.g. members eligible for nine months—**Elig-9Mo**).
††† Quantifying impact of data quality issues by systematically ignoring diagnoses (e.g. **Quality-Inp** implies that all diagnoses codes from an inpatient setting are ignored when calculating risk scores). Similarly, outpatient (-out) and professional (-prof) codes are ignored and accuracy/uncertainty results are recalculated).

The chart in Figure 6 graphically shows the dramatic decrease in the magnitude of the adjustments needed to calculate confidence intervals (y-axis) with increasing group size (corresponding to the standard model, see row 2 in Figure 5).

[12] The covariance term is a smaller contributor at the individual level—and becomes more significant for larger group sizes.

Figure 6: Adjustments Needed to Calculate Confidence Intervals With Increasing Group Size



We have described thus far some of the main results of the study under the four key questions above. There is, however, one more key question: **How can a practitioner utilize the results generated from methods such as those used in this study?** Section 2.4 in this report outlines an approach to enable calculation of confidence intervals for a given risk adjustment application. Generally this involves converting the detailed results from the application of the methodology presented in this report into a look-up table that provides confidence intervals for risk-score point estimates (given specifics for a risk assessment application). For example, if the best estimate for average plan risk is 1.02, the tools in this report provide a means to calculate the interval within which the actual risk of the plan is expected to lie with a certain degree of confidence. While the best estimate is still the one used in pricing and calculating adjustments, this quantification of uncertainty provides the practitioner key information regarding the expected variation of actuals from estimates.

Key Limitations: We used Medicare FFS 5% data sample, the CMS-HCC risk adjustment model, and bootstrapping to construct the empirical confidence intervals. While the actual results may not be applicable to a non-Medicare population, the methods and procedures described herein are population- and model-neutral. A practitioner may be able to use any risk assessment model and the methodology described in this report to calculate uncertainty-related metrics on their own data. A more detailed discussion of limitations of this study is presented in Section 3.

The rest of the paper is organized as follows. Section 1 discusses the importance of risk adjustment in the context of national healthcare reform, including the motivation and key analytic questions explored in this research. Section 2 describes the data set, analytic approaches, results, and our interpretations.

Section 3 discusses the limitations of this research and puts forward additional questions relating to uncertainty in risk adjustment that also need to be analyzed. The technical appendices contain more information on risk adjustment applications, detailed study results, rate-setting examples, and details on how the metrics in the report are calculated.

1. Risk adjustment applications and recent developments

In healthcare financing and payment, claim-based risk adjustment often involves a two-step process. The first step is risk assessment, which measures the relative health status of each individual in a population using data elements from standard healthcare claims. The second step is risk adjustment, which compares the average health status of individuals enrolled with two or more entities in order to adjust payments or premiums. In this step funds are transferred based on the average risk scores of groups, where the groups may be a health plan under a risk-based capitation arrangement (e.g. Medicare Advantage or Medicaid managed care) or a provider organization under a global risk contract. The relative measures of health status are expressed numerically as relative risk scores, which can be further converted into a dollar prediction of healthcare cost. For instance, if 1.0 is the average relative risk score of the population, where the average expected total cost is $4,000 a year, then an individual with a relative risk score of 2.5 is expected to cost 2.5 times this average, or $10,000 a year. The relative risk scores are developed using a combination of clinical rules and statistical modeling.

Risk adjustment is an increasingly important task for actuaries working in various segments of the healthcare market. Capitation payments are affected by risk adjustment among all Medicare Advantage and Medicare Part D health plans. Nineteen or so states (including Arizona, Colorado, Delaware, Florida, Maryland, Massachusetts, Michigan, Minnesota, New Jersey, New York, Ohio, Oregon, Pennsylvania, South Carolina, Tennessee, Texas, Utah, Washington, and Wisconsin) have implemented risk adjustment in their various state programs. In the private health insurance and employer market, risk adjustment has been used in trend analysis, renewal underwriting, benefit design, provider contracting, provider profiling, and pay-for-performance programs. In healthcare outcomes research studies, risk adjustment is a standard practice to account for the differences in health status in different populations when measuring the economic and quality outcomes of medical and clinical intervention programs. Internationally, risk adjustment is used by governmental organizations in setting national and regional healthcare budgets.

Risk adjustment has been established as a key risk mitigation tool in health insurance reform and provider payment reform. Section 1343 of the Patient Protection and Affordable Care Act (PPACA) mandates risk adjustment to be used to assess charges and payments to health plans based on the relative health status of their insured populations. The individual and small group markets within a state will be subject to these provisions.

Section 3022 of the PPACA establishes the Medicare Shared Savings Program (MSSP). In CMS's final ruling on MSSP on November 2, 2011,[13] historical benchmark expenditures will be adjusted based on the CMS-HCC risk adjustment model. In the performance year, newly assigned beneficiaries will be risk-adjusted using the CMS-HCC model. Because of concerns related to up-coding, CMS has decided that continuously assigned beneficiaries will be measured using the demographic factors unless their CMS-HCC risk scores are lower than their demographic factors. In commercial markets, health insurers are implementing global payment programs and patient-centered medical home programs in which risk adjustment is used to adjust payments to provider organizations as well as in the calculation of performance-based bonuses. Risk-adjusted episode methodology has also been used in provider profiling, and is expected to play an important role in bundled payments as well.

Additional notes on risk adjustment as it relates to healthcare reform are presented in Appendix B.

Healthcare actuaries can benefit from an in-depth understanding of risk assessment and risk adjustment as it is a key driver of the bottom line of healthcare organizations. Because of the PPACA and other healthcare reform initiatives, risk adjustment should no longer be a specialized skill but rather a core competency of the actuarial professional in healthcare. Given its importance, the Actuarial Standards Board of the American Academy of Actuaries recently released an Actuarial Standard of Practice (ASOP) on risk adjustment.[14]

Actuarial expertise in risk assessment continues to evolve. There has been research into the accuracy of risk assessment methodologies,[15] potential applications,[16] and implementation issues.[17] Yet the

[13] Federal Register (November 2, 2011). Medicare Program; Medicare Shared Savings Program; Accountable Care Organizations: A Rule. Retrieved May 15, 2012, from http://www.federalregister.gov/articles/2011/11/02/2011-27461/medicare-program-medicare-shared-savings-program-accountable-care-organizations.
[14] Actuarial Standards Board. The Use of Health Status Based Risk Adjustment Methodologies. Current Actuarial Standards of Practice. http://www.actuarialstandardsboard.org/pdf/asop045_164.pdf.
[15] Winkelman, R. & Mehmud, S. (2007). A Comparative Analysis of Claims-Based Tools for Health Risk Assessment. Society of Actuaries. Retrieved May 15, 2012, from http://soa.org/research/health/hlth-risk-assement.aspx.
[16] Ellis & Yi, Applying diagnosis-based predictive models, ibid.

quantification of uncertainty in risk assessment has been missing from our comprehensive understanding and skill set. The results from risk adjustment models have been presented as point estimates. For example, we have two groups of 50 patients; one group's average risk score is 1.2 and the other group's average is 1.3. We do not have tools to answer questions such as how the two groups compare in their average risk scores, whether the differences are statistically meaningful enough to justify a movement in the budget for these two groups, and whether the differences are a reflection of the true differences in illness burden or a result of data quality differences. The overarching goal of this research is to provide an analytic framework and an empirical approach to address these questions.

Note: Appendix A presents an (introductory) overview of risk assessment and adjustment.

1.1 Research objectives

In light of the discussion above, the main objectives in this research are outlined below.

- **Quantifying uncertainty**: The report aims to provide a methodology for calculating two key measures of uncertainty in risk adjustment: (1) statistical significance testing to determine whether the observed differences in predicted average group risk scores are statistically significant, and (2) confidence intervals that provide the practitioner a measure of the limits within which the actual risk will lie with a certain degree of confidence.
- **Quantifying impact**: There are several constraints in practical risk adjustment work. A practitioner needs to deal with data that is less than perfect, missing diagnosis codes, partial eligibility, turnover, and lag—all of these contribute to increasing the uncertainty in predicted risk and impact accuracy. In this paper we simulate and study these effects and quantify their impact on accuracy,[18] uncertainty,[19] and bias[20] in predictions.

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[17] Society of Actuaries (2000). Risk Adjuster Implementation Issues. Las Vegas Spring Meeting, Session 125PD. Retrieved May 15, 2012, via http://www.soa.org/search.aspx?go=True&q=&page=1&pagesize=10&or=True&refine=AQ1Kb2huIE0gQmVydGtvFgFhdXRob3Jzc2VhcmNoYWJsZW11bHRpAQJeIgIiJA==&taxid=446.

[18] The accuracy of a measurement is the extent to which it is in agreement with the *true/actual* value. In risk adjustment analysis, the measure of accuracy most commonly used is R-Squared.

[19] Refers to an estimation of the range of values within which the true value is asserted to lie. Broadly speaking, there are two perspectives on this: (1) Bayesian uncertainty: Uncertainty is quantified by determining the extent to which a *prior opinion* about a parameter value is changed in the light of observed data. A Bayesian formulation of uncertainty involves constructing a *credible* interval, and making a statement of its probability of being true, e.g.,

In a prospective application of risk adjustment, note that with the benefit of hindsight the confidence interval calculation may include a bias to the extent that expected cost is different from actual. For example, if actual average expense in year 2 for the two plans came out to be $480.00 rather than $450.00 as in Figure 1, the confidence interval bounds will need to be increased by the difference (i.e., $30.00) in order to adequately capture the uncertainty stemming from inaccuracies that are due to risk score measurement alone. In reality, any inaccuracy in the projection of cost would add to the total uncertainty, resulting in broader confidence intervals. The research presented in this report focuses only on uncertainty owing from the comparison of risk scores to actual costs, and assumes the overall average predicted cost across all groups is normalized to the average actual cost. The report presents risk-score-based confidence intervals, with the possibility for extending the methods and tools to include population-level claim-based intervals. Readers interested in a distribution of expected dollars would need to consider both sources of uncertainty (i.e., imperfect measurement of normalized risk, and an imperfect projected cost level for the 1.00 benchmark).

2. Methodology and results

This section presents the methodology and key results of the research. The methodology is explained in three subsections: (1) inclusion and exclusion criteria used to create the data files used in this research, (2) metrics and the algorithms used to calculate the metrics to answer targeted questions, and (3) key results.

"There is a 95% probability that this interval contains the true value"; (2) frequentist uncertainty: Uncertainty is quantified by investigating how an estimate would vary in repeated sampling from a population. A frequentist formulation of uncertainty involves constructing a *confidence* interval, and making a statement of how frequently it is likely to be true, e.g., "95% of similarly constructed intervals will contain the true value." The term *prediction interval* is used when the estimated value is for a future observation. In this report we take the latter approach (i.e., frequentist) to calculation of confidence intervals—bootstrapping to create many examples of a simulated population and then empirically measuring the distribution of the error term over that population.

[20] This is the difference between the expectation from an estimator and the true value being estimated. As such, in risk adjustment, bias is a group-level measure of agreement with the true value, as well as a measure of *systematic* error in measurement. Bias is usually considered at the *population* level (i.e., normalizing risk scores), but there may exist bias in subpopulations (e.g. by demographic category, not tested in this study, or due to data quality, which is tested in this study).

The results from this study are not intended to be applicable to a commercial population because they are based on Medicare data and the groups are artificially created using random and non-random assignments. However, the methods and procedures described herein are applicable to all population types.

2.1 Data preparation

We used the 2006-2008 Medicare Limited Data Set (LDS) for this research and filtered the LDS to construct the study sample. A two-year data series is sufficient to support most of the analyses in this report. We included an additional year in order to study the impact of claim and administrative lags on the accuracy of risk adjustment.

- **Hospice members**: Hospice months are excluded to be consistent with how the prospective performance testing sample is prepared by other researchers (Gregory C Pope, 2011). This allows for a comparison of relative predictive performance. According to Pope et al., hospice diagnoses do not add much by way of predictive accuracy—and they are excluded from their testing because HMOs are not responsible for costs in hospice.
- **Members with unequal Part A and Part B eligibility**: The idea here is to eliminate variability in claims from members having only Part A (i.e., inpatient) or Part B (i.e., outpatient) eligibility. We selected members that had both for their entire eligibility span across 2006-2008. As the intent here is to measure the uncertainty in risk scores, we wish to create as complete a diagnostic profile as possible using all available claims.
- **Members with HMO months**: HMO claims will not show up in LDS data and claims for these members may appear understated and increase the variability of claims in the sample. Therefore we removed such members from the study.
- **Members that expire during the year**: They were removed to limit variability that is due to high end-of-life costs.
- **Members with end-stage renal disease (ESRD) indication**: CMS has an entirely different risk adjustment model for ESRD members, whose claims are much higher and therefore can be treated as a different population altogether. We did not include members with ESRD indication.

- **Members residing outside of the United States**: Not all of the healthcare costs for these members may be captured if healthcare is received outside of the United States, and so we exclude such members.
- **Continuous enrollment**: We required that members were continuously enrolled in calendar year (CY) 2007 and the prediction year, CY 2008. This is a more stringent requirement than, for example, members with at least one month in the prediction period. However, this adjustment nets out only about 1,500 fewer people, which is due to a combination of other filters already applied and little turnover.
- **Data noise**: Very small exclusions (about 200 members) were made for members with obvious data noise (e.g. duplicate gender/date of birth indication).

To minimize the impact of extreme high-cost outliers, we censored each year's total cost at the 99.99th percentile. We further limited the sample to only include members that were enrolled throughout 2007 and 2008.[21] This resulted in our final sample, comprising a total of 1,304,910 individuals. The table in Figure 7 shows the selected members after applying the filtration criteria.

Figure 7: Sample Selection

	2007	2008
Total Members	2,327,546	2,385,655
Excl. Hospice*	49,943	52,639
Excl. Outside U.S.	18,935	19,486
Excl. ESRD	21,677	22,253
Excl. Where Part A Months <> Part B	196,177	208,587
Excl. HMO Covered	466,869	530,219
Excl. Deceased	57,333	54,730
Excl. Noise	151	161
Limit to 2007-2008 / Final Sample	1,304,910	1,304,910

* Exclusions are applied in sequence (i.e., total deceased in the sample is higher than shown).

We used the diagnosis information from LDS to calculate risk score predictions using the 2012 CMS software tool.[22]

[21] We did this to simplify our analytics (not a major change because turnover is small in this population). The data set could also be prepared by limiting it to members that have at least one member month in the next year (for prospective study of risk scores) and using PMPM rather than per member per year (PMPY) costs as a dependent variable.

[22] CMS (2012). Medicare Advantage Rates & Statistics. Retrieved May 15, 2012, from https://www.cms.gov/MedicareAdvtgSpecRateStats/06_Risk_adjustment.asp.

Note: Additional notes on data and software are presented in Appendix D.

2.1.1 Non-random groups

We used a random assignment of members to create groups of various sizes. However, in the real world groups are not formed randomly. For example, industry codes have been used as a factor in underwriting because co-workers are expected to be somewhat similar to each other in relative morbidity than to a person drawn at random from the larger population.

Using the same idea, we created non-random groups using similarities in predicted risk scores for individuals. The non-random groups were formed by sorting individuals by risk score, randomly selecting a risk score threshold between zero and one, and then taking the top *x* members below that threshold. The degree of non-randomness in a group is a variable property. A given group may include members with very similar predicted scores (e.g. there may be very little demographic variation and the members may all have very similar clinical condition profiles)—or it may include only a few members with similar risk profiles. We created groups that were 1%, 2%, 5%, 15%, and 75% non-random. A 1% non-random group of size, say, 5,000 means that 50 of the members within the group will have predicted risk scores that are similar (and likewise for 2% and higher degrees of non-randomness). Creating non-random groups in this manner allowed us to calculate and test accuracy and uncertainty metrics by varying the degree of random assignment of individuals to groups.

2.2 Metrics and algorithms

We created a macro program to iterate over an input table and to output accuracy and uncertainty metrics that are included in this report. A high-level description of what the macro is aiming to accomplish is as follows:

1. **Generate risk scores:** This research aims to understand the uncertainty in various types of risk score predictions. A total of 12 variations are considered and all are developed using the underlying Medicare data used in this study. These predictions are as follows (described further in Section 2.3.2):
    - **Age/gender only**

- **Standard CMS-HCC:** This refers to a risk score that is obtained by applying the CMS-HCC risk adjuster to complete data (this is treated as the baseline risk score when compared to other variations below).
- **Lag:** Two versions of risk scores are produced incorporating a three- and a six-month *lag*, respectively. The lag refers to the time between the last incurred date of the base data and the first date of the period for which predictions are being calculated.
- **Eligibility:** Partial eligibility is a significant issue with risk score application and may lead to biased average scores. Three versions of risk scores are calculated, for members with an average eligibility of nine, six, and three months during the base period.
- **Turnover:** Another issue that impacts the quality of risk-score estimates and their certainties is the change in population that gets risk-adjusted year to year. Two versions of risk-score predictions are calculated assuming scenarios of 10% and 30% turnover.
- **Data quality:** Last but certainly not least, three versions of risk scores are calculated assuming incomplete inpatient, outpatient, or professional diagnoses in underlying encounter data.

2. **Metrics:** The macro iterates over predictions (12 in total as described above) and group sizes (eight, described below) to generate 96 (12 x 8) sets of the following information:
   - Number of members and member months in current sample
   - Average value of prediction and actual (allows for calculation of any bias)
   - Variance of prediction and actual (used for calculation of statistical significance)
   - R-Squared (i.e., 1 – Error Sum of Squares / Total Sum of Squares)
   - Mean absolute prediction error
   - Distribution of statistical errors[23] for each set (to allow for charting and for estimation of confidence intervals using the kernel density estimation [KDE] procedure)
3. **Group size:** Group sizes of one (individual), two, five, 25, 50 (small group), 250, 1,000 (large group), and 5,000 (e.g. jumbo/small plan) are considered in the study.
4. **Bootstrapping:** For each combination of prediction and group size, we bootstrap (random sampling with replacement—see Appendix E) to create simulated examples of individuals and

[23] Errors are related to the concept of accuracy, but slightly different. Accuracy is expressed as the *closeness* of a measured value to the true value, while error is simply the difference between them. Error can be broken into *systematic* and *random* error. Systematic error is related to bias, and can be corrected for. Random error cannot be explained away—and contributes to the uncertainty in measurement.

groups in order to compute the distribution of the error term.[24] The table in Figure 8 shows the number of bootstrapped samples taken at each size. The right sampling size was determined through exploring the concept of convergence (explained in Appendix E).

Figure 8: Bootstrapped Sample by Group Size

Group Size	# of Samples	Sampled Individuals
1	1,000,000	1,000,000
2	500,000	1,000,000
5	200,000	1,000,000
25	35,000	875,000
50	25,000	1,250,000
250	20,000	5,000,000
1,000	15,000	15,000,000
5,000	10,000	50,000,000

2.3 Key results

This section presents a few key results from the study. Detailed results are presented in Appendix F.

2.3.1 Statistical significance

In risk adjustment, a very common practice is to calculate group average risk scores and allocate budgets based on the relativities of the average scores. When using samples to infer the relative risk of groups - the following question arises naturally — are the differences in group average risk scores statistically significant to justify the movement in the budget?

Knowing the *t*-statistic (details on how to calculate this statistic are provided below) we can compute the minimum difference in risk score needed for statistical significance at a desired level of significance. The table in Figure 9 shows these values at significance levels of 0.1 (90%)[25] and 0.05 (95%) using the data for Medicare FFS beneficiaries used in this research project and the CMS-HCC risk adjustment model.

[24] Actual less predicted.
[25] For example, at a significance level of 0.1, an interpretation is that there is a 90% chance of the means being significantly different.

Figure 9: Minimum Absolute Difference in Risk Score for Statistical Significance

Members		Min. Diff. for Sig.		
Group 1	**Group 2**	**90%**	**95%**	**99%**
50	50	0.2811	0.3370	0.4492
250	250	0.1229	0.1467	0.1935
1,000	1,000	0.0611	0.0728	0.0957
5,000	5,000	0.0273	0.0326	0.0428
10,000	10,000	0.0193	0.0230	0.0302
100,000	100,000	0.0061	0.0073	0.0096

We see that for smaller group sizes, the differences required for significance are very large. For example, risk scores must at least be different by about 28% for comparing groups of size 50 in order for a low likelihood (around 10%) that the observed difference in risk is due to chance. The minimum difference needed increases as we demand more confidence in our results. For example the minimum difference needed is about 45% for comparing groups of size 50 at the significance level of 0.01 (99%). The minimum difference required decreases by group size, but it is still material (at about 3%-4%) for groups of size 5,000.

While the table in Figure 9 provides the minimum difference for same-sized groups, the concept is easily extended to groups of different size. The table in Figure 10 provides results for a few combinations of groups of different sizes.

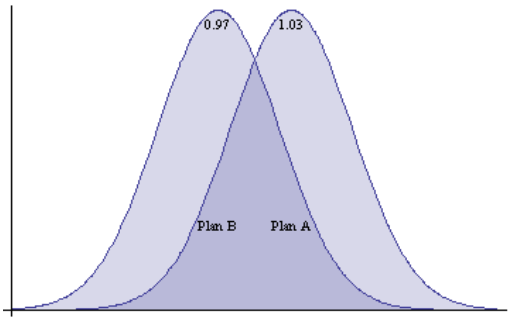
Figure 10: Minimum Absolute Difference in Risk Score for Statistical Significance (groups of different sizes)

Members		Min. Diff. for Sig.		
Group 1	**Group 2**	**90%**	**95%**	**99%**
50	100	0.2431	0.2914	0.3884
250	50	0.2144	0.2559	0.3375
1,000	500	0.0749	0.0892	0.1172
50,000	25,000	0.0106	0.0126	0.0166
50,000	1,000	0.0436	0.0520	0.0683
100,000	500	0.0613	0.0730	0.0960

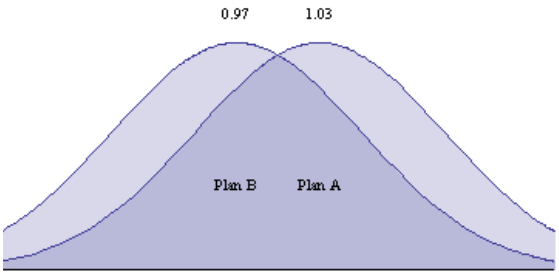
The calculation for the required minimum difference for statistical significance depends upon the size of groups that are being compared, and the sample variance of risk scores within those groups. Details on the calculation are provided below in this section.

An intuitive way to think through how significance testing works is to consider a hypothetical example. Say we have two plans, A and B (as in Figure 1). These plans have an average risk score of 1.03 and 0.97 respectively. While these point estimates of risk scores convey very useful information, we can gain further insight by looking at the confidence intervals for these estimates.[26] Consider the illustrative plots in Figure 11 for the distribution of the risk scores for members in these plans. *In each scenario the means are the same* (e.g. 1.03 for Plan A and 0.97 for Plan B)—yet they convey very different information about the certainty of these estimates and hence their interpretation.

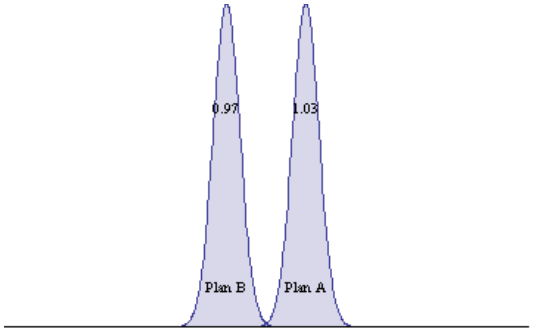
Figure 11: Comparing Risk Scores



(Chart 1)



(Chart 2)



(Chart 3)

[26] And more generally, the distribution of risk scores.

Chart 1 shows that the risk score estimates have some dispersion or variability around the mean, Chart 2 reflects high variation, and Chart 3 shows low variation. Clearly the underlying population morbidity for the two plans is more "similar" in Chart 2 than it is in Chart 3.

We used a *t*-test to determine whether or not two risk scores are statistically different. The steps involved are:

1. The research hypothesis (e.g. Group A risk score is higher than Group B risk score)
2. The null hypothesis (e.g. Group A risk score is no different than Group B risk score)
3. Use a two-tailed *t*-test
4. Select a significance level (alpha), e.g. 95%
5. Calculate the *t* statistic
6. Refer to a standard *t*-distribution table to check for whether the null hypothesis is rejected at the selected significance level

Say we are comparing the risk score from two groups (Plans A and B). The *t*-statistic can be calculated in the following manner:[27]

$$t\text{-statistic} = \left(A_{\text{Avg}} - B_{\text{Avg}}\right) \Big/ \sqrt{\frac{A_{\text{Var}}}{(N_{\text{A}}-1)} + \frac{B_{\text{Var}}}{(N_{\text{B}}-1)}}$$

Where: A_{Avg} is the average risk score for Plan A, A_{Var} is the sample variation of risk score over Plan A members, and N_{A} is the number of members in Plan A.

The *t*-test involves several assumptions. These include (1) independence of the risk scores, (2) in the formula above, that either the populations are of similar size *or* their variances are roughly equal, and (3) normal distribution of the risk scores.

Assumption 1 holds because the risk score of a person drawn randomly from Plan B does not provide information regarding the risk score of another person drawn randomly from Plan A. Risk score depends

[27] This formula is for groups that may not be of the same size, and may not have the same variance (also known as Welch's *t*-test).

on the demographic and condition markers for a given person.[28] The formula presented above is for groups that may not be of the same size, and may not have the same variance (also known as Welch's *t*-test). However, even this test may mislead in cases where the population sizes and variances are *very* different. Risk scores at an individual level are not normally distributed. However, given a large enough sample/group size, the central limit theorem implies that the average risk scores will be roughly normally distributed. In reality, no data is ever perfectly normally distributed or has exactly equal variance—therefore all practical applications of the *t*-test should be qualified as *approximate t*-tests. The empirical distributions of risk scores are presented in Appendix E (Section E.2) and indicate that the error terms look approximately normally distributed at groups of size 50 and above. We tested the normality of risk scores graphically (i.e., using a Q-Q plot) for groups of various sizes, and the test was generally not passed by groups of sizes less than 50. Details of this test are presented in Appendix E (Section E.4).

2.3.2 Data quality issues in risk adjustment

The Medicare Advantage program has been using risk adjustment to set program payment rates since the early part of the last decade. The risk adjustment methodology, generally referred to as the Hierarchical Condition Category (HCC) model, begins by classifying the ICD-9-CM diagnosis codes recorded in standard healthcare claims into clinically homogenous categories that also have similar cost and utilization patterns. Clinical hierarchies are further imposed to reduce the sensitivity of the model with respect to coding proliferation. Diagnosis information recorded in lab, radiology, transportation, home health, and durable medical equipment are typically not used for scoring because they are either rule-out diagnoses or coded by non-clinicians.

More severe diseases within a hierarchical group are identified by looking at the 4th and 5th digit of the ICD-9-CM codes, with the intention of encouraging coding specificity.[29] For instance, "250," which is the root code for all diabetes, is grouped into the lowest category in the HCC hierarchy for diabetes, "Diabetes with no Complications," and "250.40," which is for diabetes with renal manifestations, is grouped into the highest category for diabetes. The categories higher in the hierarchy usually are associated with higher cost. Conceivably, provider organizations that do not code specifically to the 4th

[28] This holds even though we use the same model (and risk coefficients) on two different populations. This can be compared to using the same measurement method/tool to measure heights in randomly collected men and women (i.e., the samples would still be independent).
[29] Pope et al. (2004).

or 5th digit of the ICD-9-CM can be underestimating the health status of their patients. Everything else being equal, payment rates to health plans with poor coding specificity would be lower, resulting in distortions in payments for the entire system.

Another area of potential distortion is the persistency in diagnosis coding. Risk scores are often generated based on rolling 12 months' of claims. Chronic illnesses such as diabetes need to be coded persistently over time in order to be captured by risk adjustment. In practice, however, health plans have observed that a large percentage of patients with chronic illnesses are not always coded as having the conditions in claims. For instance, some reported that roughly 30% of diabetes patients coded in year 1 would not have any diabetes diagnosis codes in year 2, yet there is prescription and procedure data to support that the patients had been treated for the conditions. Similar to the coding specificity issue, inconsistent coding would also lead to distortions in the system. On a related note, a prospective application of risk adjustment is generally more sensitive to chronic conditions than a concurrent application that emphasizes acute cases. Therefore deficiencies in the coding of chronic or acute conditions will impact risk adjustment differently if it is prospective versus if it is concurrent.

To ensure more fair and adequate payments, health plans and provider organizations have spent large amounts of resources to improve coding and their clinical and billing data systems. The increase in risk scores thus might be attributed to both the increase in the illness burden of the population as well as improved coding.[30] In this paper, we attempt to measure the impact of data quality (on accuracy and uncertainty statistics) by varying the input data. A total of 12 risk scores were calculated based on the various input data assumptions. They are:

Baseline demographic scores: Demographic-only risk score as developed by CMS. These scores are used to illustrate the uncertainty when only age and gender are used to estimate the risk differentials in a population; in fact, demographic rate cells are the most widely used *risk adjusters*. Illustrating uncertainty in demographic-only risk adjustment is also important to understand how turnover and months of member eligibility impact accuracy and uncertainty.

Standard model scores: We used CY 2007 diagnoses to predict CY 2008 total expenditure using the 2012 CMS-HCC risk adjustment model. Continuous enrollment in CY 2007 and CY 2008 was imposed, and as a result, issues such as lag, turnover, and partial-year eligibility are not considered. The standard scores

[30] Section 3203 of the PPACA implements coding intensity adjustment to Medicare Advantage payment rates.

will be used as the reference point to quantify the impact on accuracy and uncertainty in risk adjustment under "substandard" scenarios.

Lagged scores: Timing is a key practical issue in risk adjustment applications. Most models are fitted to predict a contiguous 12-month period, but in most practical situations there is a lag between experience and effective periods. The lag can be from delay in the completion of data or from the time needed to calculate scores and associated analytics. We calculated two versions of lagged risk scores in order to quantify the impact on the accuracy and uncertainty metrics:

1. **One-quarter lag:** Used CY 2006 Quarter 4 (Q4) and CY 2007 Q1-Q3 diagnoses to predict CY 2008 risk using the CMS-HCC risk adjustment model.
2. **Two-quarter lag:** Used CY 2006 Q3-Q4 and CY 2007 Q1-Q2 to predict CY 2008.

Partial-year scores: Partial-year eligibility is one of the more common limitations in risk adjustment applications. In economic downturns this issue is expected to be even more common. In order to assess the impact of limited claim experience, we restricted eligibility to various levels and recalculated accuracy and uncertainty metrics:

- **Nine-month eligibility:** Use CY 2007 Q2-Q4 to predict CY 2008.
- **Six-month eligibility:** Use CY 2007 Q3-Q4 to predict CY 2008.
- **Three-month eligibility:** Use CY 2007 Q4 to predict CY 2008.

Turnover: In some programs with rapidly changing populations (e.g. many state Medicaid programs and managed care plans within those programs) the issue of turnover casts doubt on the credibility of predicted plan-level scores. We simulated turnover in our selected cohort in order to quantify its impact on risk metrics in the following manner:

- **10% New Entrants:** Used CY 2007 experience but randomly assigned 10% of members an age/gender-only score, treating them as though no claim data were available on them in CY 2008.
- **30% New Entrants:** Used CY 2007 experience but randomly assigned 30% of members an age/gender-only score.

Data quality: This set of predictions investigates the extent to which poor data quality may impact the accuracy, uncertainty, and bias in predicted scores. Issues around data quality are commonplace and of

interest to the practitioner. For example, one may need to compare two health plans where one plan has a capitated contract for professional services. Diagnosis coding on capitated encounters may not be complete. We used Medicare FFS data and therefore did not have capitated data to study. However, in order to quantify the *maximum* extent of impact, we ignored diagnoses altogether by various service categories. For example, we ignored all diagnoses on professional claims. In practice this may be the case if professional data are not available or reliable. It is important to note that data quality issues are expected to feature prominently in the near term as risk adjustment is applied nationwide under the provisions of the PPACA. Data may be messy, especially initially, and one would expect improvement over time given financial incentives to code appropriately.

The results presented later show that the impact on accuracy and uncertainty metrics is not as large as one may initially suspect, as codes ignored from one setting may show up in another (e.g. diagnoses in an inpatient file may also be present in the professional file).The predictions tested were:

- Used CY 2007 experience but ignored diagnoses from the inpatient file.
- Used CY 2007 experience but ignored diagnoses from the outpatient file.
- Used CY 2007 experience but ignored diagnosis from the professional file.

2.3.3 Uncertainty metrics by varying data quality

Risk adjustment models are typically developed on data from large and representative populations, and as such, they assume average treatment patterns, provider contracting, management efficiency, plan cost structure, etc. When applied to a population that was external to the population used for model development, a natural question arises: How accurate is the model for this external population? A confidence interval[31] allows us to make a statement of the sort that if 100 such intervals are constructed, the *actual* value will be contained within the intervals a specified percent of the time. We analyzed empirically constructed confidence intervals several different ways during the course of this research. A summary of results is presented below.

Confidence intervals by group size

Figure 12 shows the confidence intervals constructed using the empirical method described in Appendix E. We see that as we demand more confidence in the predictions from the CMS-HCC model, the confidence intervals widen. We also see that confidence intervals become smaller with increasing group

[31] Technically a *prediction interval*, but we use these terms interchangeably in this paper.

size as the variation in predicted and actual values narrows. Note that the values given below are adjustments to a given risk score. If you have a group of 5,000 lives and the calculated risk score is 0.98, then the 80% confidence interval for this group is {0.98-0.036=0.944, 0.98+0.036=1.016}. The risk score confidence intervals thus constructed are bounded by zero at the low end.

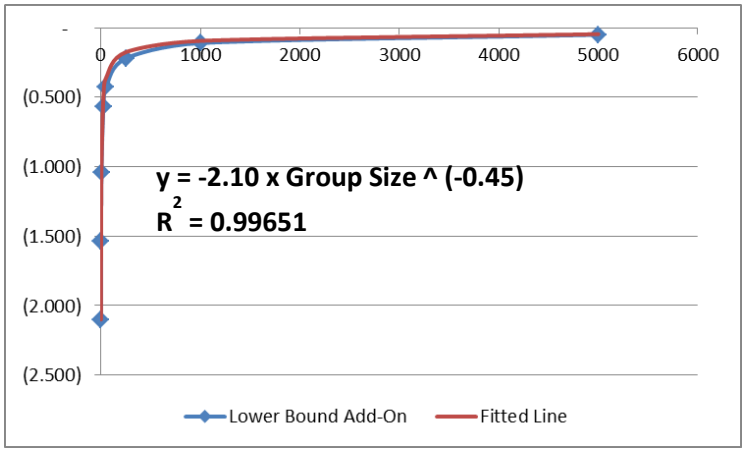
Figure 12: Confidence Intervals by Group Size for Standard Model Predictions[32]

Group Size	80%	90%	95%
1	{-1.16,1.35}[33]	{-1.6,2.81}	{-2.1,4.61}
2	{-0.97,1.24}	{-1.25,2.21}	{-1.54,3.34}
5	{-0.73,0.94}	{-0.89,1.51}	{-1.04,2.14}
25	{-0.41,0.48}	{-0.49,0.69}	{-0.57,0.94}
50	{-0.31,0.34}	{-0.37,0.49}	{-0.43,0.64}
250	{-0.15,0.16}	{-0.19,0.21}	{-0.22,0.26}
1000	{-0.077,0.079}	{-0.097,0.1}	{-0.11,0.12}
5000	{-0.033,0.036}	{-0.042,0.046}	{-0.05,0.055}

In the Executive Summary we presented extrapolated results for the confidence intervals by group size and for standard model predictions. We developed these extrapolations by fitting a power-law function. For example, the graph in Figure 13 shows the lower-bound confidence interval (expressed as an additional term to the risk score) including the equation that fits the line. As we can see, the fitted line follows the empirical results quite closely. The chart for the upper bound looks similar (and of course inverted). In this manner we can extend the results of this study to estimate uncertainty in risk scores for groups of larger sizes.

[32] For randomly formed groups.
[33] Expressed as adjustments, i.e., CI = MAX(calculated score + {lower bound adj., upper bound adj.},0).

Figure 13: Lower-Bound Add-on Term vs. Group Size (empirical and modeled)



Confidence intervals by data quality

We then examined how confidence intervals change with respect to the quality of the predictions, i.e., when demographic information was used solely, versus when the CMS-HCC was used on standard claims data, versus when different lags were introduced, etc. As discussed previously, the quality of input data affects the predictive accuracy of a risk adjustment model. The question we explore here is how the confidence interval varies with respect to different levels of predictive accuracy. The table in Figure 14 shows the results by the quality of model input.

Figure 14: 90% Confidence Interval by Various Models and Group Size*

Input Data	Individual R-Sq	Grp: 1	Grp: 5	Grp: 50	Grp: 5000
1: Demo Only**	0.5%	{-1.09,3.23}	{-0.82,1.65}	{-0.39,0.53}	{-0.047,0.048}
2: Standard***	12.3%	{-1.6,2.81}	{-0.89,1.51}	{-0.37,0.49}	{-0.042,0.046}
3: Lag-1Q†	10.2%	{-1.62,2.86}	{-0.91,1.53}	{-0.38,0.51}	{-0.044,0.046}
4: Lag-2Q	8.9%	{-1.63,2.88}	{-0.92,1.53}	{-0.38,0.51}	{-0.046,0.046}
5: Elig-9Mo††	12.3%	{-1.56,2.82}	{-0.88,1.49}	{-0.37,0.51}	{-0.044,0.046}
6: Elig-6Mo	12.1%	{-1.52,2.83}	{-0.87,1.49}	{-0.38,0.49}	{-0.043,0.045}
7: Elig-3Mo	11.6%	{-1.46,2.87}	{-0.86,1.52}	{-0.37,0.51}	{-0.044,0.045}
8: Turnover-10%	11.0%	{-1.53,2.84}	{-0.88,1.51}	{-0.37,0.5}	{-0.044,0.046}
9: Turnover-30%	9.0%	{-1.37,2.95}	{-0.87,1.56}	{-0.38,0.51}	{-0.045,0.047}
10: Quality-Inp†††	12.3%	{-1.6,2.8}	{-0.89,1.5}	{-0.38,0.49}	{-0.043,0.046}
11: Quality-Out	12.3%	{-1.6,2.81}	{-0.89,1.49}	{-0.38,0.5}	{-0.044,0.045}
12: Quality-Prof	9.0%	{-1.43,2.92}	{-0.86,1.55}	{-0.38,0.5}	{-0.045,0.046}

* Expressed as adjustments, i.e., CI = MAX(calculated score + {lower bound adj., upper bound adj.},0).
** Demographic-only prediction. Other predictions are described in Section 3.1.
*** Using a standard application of the CMS-HCC model.
† Incorporating one quarter (1Q) or two quarters (2Q) lag between the experience and prediction periods.
†† Consideration of partially eligible members (e.g. members eligible for nine months, **Elig-9Mo**).
††† Quantifying impact of data quality issues by ignoring diagnoses (e.g. inpatient setting, **Quality-Inp**).

We see that there is not a lot of difference in the width of the intervals by data quality, even though they vary in predictive accuracy as measured by R-Squared. Confidence intervals are related to the variance of the error term, which can be expressed as:

$$Var(\text{Actual-Predicted}) = Var(\text{Actual}) + Var(\text{Predicted}) - 2 \times Cov(\text{Actual}, \text{Predicted})$$

We calculated the variance of the predicted and actual costs for the study population and found that the variance in actual cost (i.e., *Var*(Actual)) is over six times the variance in predictions and is by far the dominant contributor to the total variance of the error term.[34] This is the reason why, even when the R-Squared changes (i.e., prediction quality changes), the confidence intervals remain relatively unaffected.

This forms a key result in the study, i.e., the confidence intervals are impacted mainly by group size (and relatively less impacted by the accuracy of the predictions or data quality).

Data quality and bias

In risk adjustment applications, where an externally developed risk assessment model is applied to data of health plans or provider groups, the out-of-the-box risk scores typically do not average to 1.0, and one needs to take an extra step by dividing the individual risk scores by a common factor. This step is referred to as normalization. We analyzed how data quality may introduce bias in calculated risk scores.

The table in Figure 15 quantifies bias by input data quality. We calculated the out-of-the-box risk scores, and compared them to the standard HCC model (average risk score at 100%). We find that the most significant biases are introduced by partial-year eligibility,[35] as incomplete diagnostic information is used.

[34] The covariance term is a smaller contributor to total variance at the individual level, but becomes more significant for larger-sized groups.
[35] We used the most recent months' claims experience to simulate the impact of partial eligibility.

Figure 15: Bias by Model

Models	E[Pred]*
Standard	100.0%
Elig-9Mo	93.1%
Elig-6Mo	84.7%
Elig-3Mo	73.3%
Turnover-10%	100.0%
Turnover-30%	99.9%
Quality-Inp	99.7%
Quality-Out	98.0%
Quality-Prof	64.8%

* Average predicted risk scores at the individual level.

As stated before in this report, we approximate an upper bound of the change in statistics from poor-quality data. We do this by ignoring all diagnosis codes from inpatient, outpatient, and physician settings in turn. We expected that inpatient diagnoses may not be that significant as they are likely to have already been captured in the physician/outpatient settings. However, it is somewhat surprising how little bias is introduced by ignoring all inpatient and outpatient diagnoses. This is indicative of most of the codes used by the HCC program being reported in the physician setting, and consequently there is a large bias if we ignore this source of data. After all, the majority of diagnosis codes the HCC program uses are chronic conditions, which are likely to be captured in the physician setting. The table in Figure 16 shows the unique diagnoses *per claimant* separately from the professional, outpatient, and inpatient settings.

Figure 16: Average Unique Diagnoses per Claimant

	Average Unique Diagnoses Per Claimant
Professional	11
Outpatient	4
Inpatient	2

Bias is not as big of an issue if it affects plans similarly. Risk adjustment uses relative information, not absolute information. However, in other situations it can be a serious concern. Consider Plans A and B. Plan B has poor-quality physician data (to the extent that no diagnosis codes are available from it). The table in Figure 17 illustrates such a normalization process. Normalizing before adjusting the bias in Plan B's score preserves the relativity of scores between the plans. However, because we know (from Figure 16) that scores without physician codes are biased down 35%, we can first adjust the scores for this bias and then normalize. In practice an effort should be made such that bias does not arise in the first place – or that the risk adjustment model is calibrated to information that is consistently collected across plans. There may be several other options for appropriately avoiding bias in risk adjustment depending upon a given situation.

Figure 17: Illustration of Adjusting for Bias

	Mbrs	Score	Bias	Score (adj)	Score (Norm)
Plan A	5,000	1.030	100.0%	1.030	0.980
Plan B	1,000	0.750	64.8%	1.157	1.101
Total	6,000	0.983		1.051	1.000

Missing data is easily detectable and while adjusting for bias is not a common actuarial practice in risk adjustment, many practitioners will take it into account in some manner. More subtle are the issues with bias that are due to other factors, such as partial eligibility. In most applications of risk adjustment, a six-month cutoff is used to assign a risk score to an individual. For individuals with less than six months the score is not considered "credible." However, as we have seen, the risk score at nine months is only 93% of its true value, and the score at six months is 85% of its value. If we compare three populations, with mean eligibilities of 12, nine, and six months, they all are assigned a risk score. But the analysis remains biased unless explicitly corrected for. The measurement and recognition of bias can be an important refinement in many applications of risk adjustment.

Confidence intervals by random vs. non-random groupings

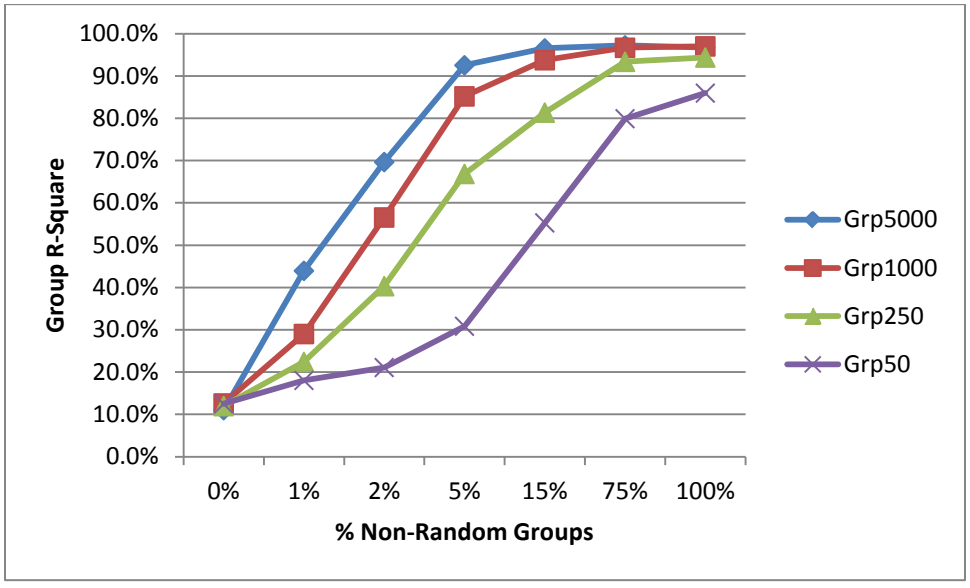
The results presented in Figure 14 are for groups generated through a bootstrap process (e.g. random sampling of 5,000 individuals, with replacement). For example, we generated 10,000 groups of 5,000

members each in this fashion (i.e., sampling 50 million members). The R-Squared metric can then be calculated over the 10,000 values for average actual cost (in year 2) and risk score (using diagnoses from year 1). The R-Squared for groups generated in this random manner is similar to the R-Squared value as calculated using individuals in the data, about 12%.

This observation is at odds with experience where we typically see a higher R-Squared metric for groups than for individuals. The reason is that only a small amount of *non-randomness* is needed in order for the R-Squared statistic to increase significantly. We simulated this effect by sorting risk scores and generating a proportion of the 10,000 groups using members with risk scores that were close together (i.e., not a random sampling, and assuming that members shared a similar risk profile). The chart in Figure 18 shows the variation of R-Squared with the percentage of groups that were generated in this non-random manner, by various group sizes. We see that the R-Squared rises faster for larger groups for the same percentage increase in non-random sampling.

In reality, members under the same employer account, patients attributed to the same providers, members in the same market segment, groups by age/gender, or groups by disease cohorts are not randomly formed. The main attributes of the grouping are either explicitly captured in a risk assessment model (e.g. age, gender, diseases), or can be approximated by a combination of factors in a risk assessment model. We expect that group R-Squared will be higher than individual R-Squared if real groups were used in this study.

Figure 18: R-Squared vs. Percentage of Groups Created Non-Randomly



We would intuitively expect that an increase in accuracy by using non-random groups would correspond with smaller confidence intervals (all else being equal). However, we observed that confidence intervals increased slightly (see Appendix F). For example, consider the 100% non-random scenario for groups of 5,000 individuals. The R-Squared is 98% for this case, whereas it is below 13% for groups that are formed completely randomly. The R-Squared for non-randomly formed groups is *not* high because the error sum of squares (ESS) is low—it is because the total sum of squares (TSS) increases dramatically.[36] For randomly formed groups the average actual cost over 5,000 lives is close to the overall average. When we form non-random groups the average risk may not be close to 1.00, and as such even a single group may contribute a squared error to TSS that exceeds the *total* TSS from all randomly formed groups. Therefore, the confidence intervals would in fact shrink with higher accuracy if the variation in actual cost were held constant. Here this is not the case and, as explained above, leads to an increase in the deviation of the error distribution.

Confidence intervals by risk score percentiles

Distribution of actual healthcare cost is heteroskedastic, i.e., the variance of actual cost is not constant. It actually increases with actual cost itself. In other words, the variability in costs is greater for higher-cost members. Risk scores and the predicted costs are developed using regression techniques under canonical parametric assumptions. The error term, which is the difference between the actual and predicted costs, is also heteroskedastic. As discussed above, the variance in the error term is driven mostly by the variance in actual cost. In practice, however, we do not know the actual cost for an individual. We do know the predicted risk score. Therefore we studied how the calculated confidence intervals varied for different percentiles of predicted risk. We segmented individual and group risk scores by 0-75, 75-90, and 90-100 percentiles.[37] We see that the impact on confidence intervals is mostly on the individual and smaller-sized groups. Confidence intervals widen for smaller-sized groups as the volatility associated with actual costs at higher risk scores increases dramatically. For larger-sized groups the volatility is muted and therefore the impact is small.

[36] The R-Squared is calculated using 1 - ESS/TSS.
[37] These break-outs were selected after studying the error distribution by various percentiles of risk scores.

Figure 19: Confidence Intervals by Risk Score Percentiles

	90% CI*		
Group Size	**0-75th**	**75-90th**	**90-100th**
1	{-0.86,2.19}	{-1.6,3.78}	{-3.28,6.02}
2	{-0.82,1.89}	{-1.35,2.74}	{-2.21,3.89}
5	{-0.71,1.36}	{-1.03,1.79}	{-1.38,2.24}
25	{-0.45,0.67}	{-0.56,0.76}	{-0.64,0.81}
50	{-0.35,0.47}	{-0.41,0.54}	{-0.45,0.56}
250	{-0.18,0.21}	{-0.2,0.22}	{-0.21,0.22}
1,000	{-0.096,0.1}	{-0.1,0.1}	{-0.1,0.11}
5,000	{-0.041,0.046}	{-0.046,0.044}	{-0.046,0.046}

* Expressed as adjustments, i.e., CI = MAX(calculated score + {lower bound adj., upper bound adj.},0).

2.4 Toward a practical application

The detailed results presented in Appendix F contain a lot of information but they can be condensed into a simple lookup table that an actuary can use to determine the appropriate confidence interval to apply to a risk score. Confidence intervals vary by group size, lag, turnover, partial eligibility, risk score percentile, and expected accuracy of the risk-score predictions (at individual or group level). Confidence intervals also will vary by the type of population/data and model used. The methods presented in this study, however, may be used to develop the appropriate set of results.

Once these results have been developed we can look up the corresponding confidence interval. For example, say we have a group of 995 Medicare FFS members with an average risk score of 1.02. The average eligibility of the group is 12 months and there is a lag of three months between the experience period used to assess the risk and the period during which the score is effective. From Appendix F, the nearest corresponding 90% confidence interval (i.e., group size of 1,000) for this situation is {1.02-0.099, 1.02+0.1} = **{0.921, 1.12}**. This means that while the best estimate for risk is 1.02, the actual risk for a plan may lie between 0.92 and 1.12 with a 90% confidence.

3. Discussion, limitations, and recommendations

This report focused on a discussion of uncertainty in risk assessment and adjustment. We saw how practitioners currently deal with uncertainty in state-of-the-art risk adjustment, and developed new tools to allow us to paint a better picture of the underlying uncertainty in our calculations.

The analysis described in this report has limitations. Some important limitations are discussed below, and some of these also serve as ideas for follow-up studies.

- **Limited to a Medicare data set**: Different populations behave differently with regards to predictability of their healthcare costs, which in turn drives conclusions regarding confidence intervals and significance calculations. The conclusions presented in this paper are limited in scope to a Medicare population, and may or may not generalize well to a commercial or a Medicaid sample. However, the methodology presented here may generalize, and it would be interesting to see how well the results hold against other populations.
- **Simulated and non-real groups were considered**: One can argue that real groups behave differently than simulated groups, which are essentially a random assortment of individuals. We did not have enough information on individuals within the CMS sample to probabilistically match them on characteristics so it was effectively a randomized group sampling technique. In this report we also simulated non-random groups by including clusters of members having the same or similar risk score and this does get us closer to real groups. Within real groups individuals may share characteristics such as conditions, risk scores, and perhaps lower within-group variations in cost than is assumed in the methodology developed above. Differences in the variation within a group are unlikely, though, to have a significant effect on the conclusions of this report. The year-over-year variation in costs may be relatively different in real groups versus simulated ones, and that will drive differences in accuracy and uncertainty measures that are reported here. We note that the impact on calculated confidence intervals from non-random groups was somewhat muted (especially at larger group sizes), and so this may not be a serious limitation of this study (and more generally any reproduction of methods herein on other data).
- **HCC model only**: Only the HCC model was considered, which does not include a pharmacy component that would likely improve accuracy. Different risk assessment models will produce different scenarios for accuracy and confidence-interval construction. The methods developed in the report are model-independent, and can be applied to any approach. We note, however, that because confidence intervals are not very sensitive to changes in accuracy this may not be a serious limitation, though important to test.

- **Cross-effects**: The research investigates the impact of each source of uncertainty in turn, and we did not study cross-effects. For example, how do the measured statistics change if we have partial eligibility *and* lag?
- **Prediction vs. payment**: Because the width of calculated confidence intervals is driven primarily by the variation in actual costs, it is worth considering carefully what cost information is used. We used actual cost (allowed) from Medicare FFS data. This cost information contains variations potentially unrelated to morbidity (e.g. teaching vs. other hospitals, geographic variations in rates, different treatment patterns, etc.). Including these variations in the confidence intervals is appropriate if one is predicting actual cost, but we may not wish to include this uncertainty in a payment approach. As an example, we may want to remove allowable rating factors from the dependent cost variable prior to calculating risk scores and uncertainty metrics.
- **Underwriting**: When using risk scores in underwriting, it is common to place more credibility relative to experience on risk scores for smaller groups, and to place higher credibility on experience for larger groups. The exact numbers are more or less subjectively determined. An interesting study would explore (1) the relative accuracy of experience versus risk scores at varying group sizes, and (2) the resulting confidence intervals for predictions, in order to determine credibility factors at varying group sizes.
- **Uncertainty in accuracy**: This report is on uncertainty in risk adjustment, and no one is certain regarding the *value* of accuracy metrics. For example, when deciding among a risk assessment model having a 12% R-Squared versus one that has 15%, how is an additional benefit determined from the increase in R-Squared? Higher accuracy is preferable but needs to be weighed against cost and complexity of an approach. Appendix C outlines some thoughts regarding how to compare approaches with varying accuracy in terms of their bottom-line business impact. The crucial idea is to first tie performance to specific business decisions. Further research along these lines will be of interest to practitioners, especially to understand performance and to evaluate tools under the risk adjustment provisions of the PPACA.
- **Additional effects**: In discussions with the project oversight group for this project, we concluded that it would be interesting to quantify uncertainty by chronic illness or service categories. Risk adjustment models so far have been using the presence of conditions as the basis to score members and groups. Uncertainties around the duration, progression, and recurrence of chronic conditions are not considered in risk adjustment. However, we could not accomplish this within

the scope of this project. As a follow-up, some practitioners may find this information interesting and important.

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Appendix A: Risk-adjusted rate setting

The purpose of this section is to present a very high-level overview on how risk assessment and adjustment are typically performed. These notes are introductory in nature and experienced readers may wish to skip them.

A.1 Health risk assessment

Claim-based risk assessment in healthcare is the process of determining the relative costs of a person based on their medical history. A typical process is to *group* the diagnosis and/or prescription drug history of a patient into *condition categories*. These groupings are intended to be as homogeneous as possible with respect to clinical meaningfulness and cost. The categories serve as indicators for whether a person has that condition. For example, a table such as the one shown in Figure 20 may be constructed from claim data using a grouping mechanism.

Figure 20: Example of a Risk Adjuster Interim Output

	Age/Gender Categories			Condition Categories		
	M, 19-24	M, 25-29	F, 60-64	Asthma	Diabetes	Fracture
Patient A	0	1	0	1	0	1
Patient B	1	0	0	1	1	0
Patient C	0	0	1	0	0	0

Figure 20 shows that Patient A is a male who is between 25 and 29 years old, has asthma, and suffered a fracture. A typical grouping table such as this would include about a dozen age/gender bins and anywhere from about 40 to over 1,000 condition categories. These categories are binary indicators, with a value of 1 indicating that the person is assigned to the category. The actual number and logic for categorization varies by the different commercial and public-domain software tools available to the actuary.

Once an individual is grouped, typically an additive regression model is applied to calculate the risk score. A general form of the model is:

$$c + \sum_i \alpha_i X_i = Y$$

Where *c* is the intercept term in a linear regression model, each alpha represents the coefficients of regression, and the summation is over the age/gender and condition group binary indicators. The dependent variable, *Y*, is typically the total medical cost over the year contiguous to the experience year.

Thus assuming the coefficients of this model are ({*c*, M-25-29, Asthma, Fracture}→ {0.2, 0.33, 0.35, 0.01}) we can calculate the risk score for Patient A (0.2+0.33+0.25+0.01 = 0.79). A risk score of 0.79 indicates that Patient A is expected to cost 21% less than an average member over the next year.

The coefficients of regression have an associated error (i.e., the *standard error*). Typically these errors are not considered in the risk adjustment process. The coefficients and resulting risk score are accepted as being deterministic point-estimates out of a given model. Because a focus in this research is to develop a methodology to quantify uncertainty, the question naturally arises of whether we can use the standard error in coefficients to quantify the uncertainty of a risk score estimate. There are reasons why this does not work in practice—these are further explained in Appendix E.

A.2 Health risk adjustment

The prior section explained the assessment of risk. In this section we go over at a high level how risk score estimates may be used to adjust revenue to health plans. Assume that we have three plans (A, B, and C) and there is an overall capitation rate of $400.00 for these plans. In practice, this capitation rate will vary by several considerations (population type, demographics, region, etc.); however, for simplicity, we assume that this rate varies only by the average risk score for each of the plans.[38]

We assume that Plans A, B, and C have 1,000, 5,000, and 20,000 members respectively. An implied assumption here is that this distribution reflects the same distribution under the effective period for the rates, as normalization of risk depends upon it. This represents the first source of uncertainty in the practice of risk adjustment, and that is that the overall risk (normalized to 1.00) may not remain at a constant level under the effective period of the rates.

Another practical limitation concerns the morbidity of members that do not have sufficient eligibility in the base period to assign them a risk score. Sufficiency of eligibility is more or less a judgment call, with the popular choice being to require six months or more to record a risk score. As we have shown in this

[38] Note that when considering effects such as regional variation either the rates may be developed separately or factors adjusted so as not to double-count effects when used in conjunction with risk scores.

report, partial eligibility can significantly bias calculated risk scores. Practitioners have several available options to deal with partially eligible members. The members not assigned a risk score can be assigned a purely age/gender score calculated over the population, or some blend of an age/gender score with the risk of the members who are assigned a risk score for the same plan.[39] The latter approach rests on the belief that partially eligible or new members will share (to an assumed extent) the morbidity profile of the members already in that plan. The weights in such a blending are a matter of judgment and may depend upon several considerations (e.g. is the plan enrollment process in the effective period consistent with the base period?).The table in Figure 21 shows the construction of our hypothetical example thus far, with the approach that newer members are simply assigned the overall age/gender scores (e.g. we expect random enrollment during the effective period). The blended risk score is then normalized to 1.00 over the population.

Figure 21: Example of a Plan-Level Risk Scoring Exercise

	Total Mbrs	Newer Mbrs	A/G*	Risk Score	Blended Score	Norm Risk
Plan A	1,000	200	1.020	1.040	1.036	1.033
Plan B	5,000	450	0.990	0.970	0.972	0.969
Plan C	20,000	3,100	1.002	1.010	1.009	1.006
Total	26,000	3,750	1.000	1.003	1.003	1.000

* Age/gender score

We assume a $400.00 capitation rate that is to be adjusted using the relative morbidity by plan. The adjustment is budget-neutral (as risk scores normalize to 1.00) and money is simply transferred from one plan to the other.

[39] With appropriate adjustments, e.g. normalized for differences in demographic mix between the scored and un-scored members.

Figure 22: Example of a Risk Adjustment Calculation

	Total Mbrs	Norm Risk	Cap Rate*	Adj. Cap Rate	Adjustment**
Plan A	1,000	1.033	$400.00	$413.31	$159,704.47
Plan B	5,000	0.969	$400.00	$387.70	-$738,220.05
Plan C	20,000	1.006	$400.00	$402.41	$578,515.57
Total	26,000	1.000	$400.00	$400.00	$0.00

* PMPM
**Annual settlement

The above discussion largely encapsulates the current state of the art in the practice of risk adjustment. In practice there are many complex issues that need to be carefully worked through (e.g. choice of model used, differences in benefit levels, prospective vs. retrospective/concurrent risk scoring, confluence with other adjustments, exclusion of services not at risk, etc.); however, this simplistic example captures the major considerations.

The overriding intent of risk adjustment in payment applications is to neutralize incentives for selection of members by plans based on morbidity risk. The extent to which this is achieved depends upon the effectiveness of the risk-scoring process to capture the actual differences in morbidity risk during the effective period.

Appendix C presents a discussion aimed at quantifying the impact from increased accuracy of risk assessment tools.

Appendix B: Risk adjustment in healthcare reform

Section 1343 of the PPACA mandates that payments among health plans having different actuarial risks within a state need to be risk-adjusted. The only functioning health insurance exchange that has risk adjustment is the Massachusetts Commonwealth Health Insurance Connector Authority (Connector). The Connector uses a diagnosis-based prospective risk adjustment model in managed care procurement for its Commonwealth Care Program (CommCare). CommCare is a subsidized program for members eligible with income of up to 300% of the federal poverty level (FPL).

Risk adjustment was first considered by the Connector in the summer of 2008. At that time, the Connector had about 15 months of claims and had been adjusting premiums based on age/gender, geographic areas, and benefit levels. Feeling the need to make more accurate payments and incentivize a higher degree of market participation by more managed care organizations, the Connector decided to include risk adjustment as a procurement strategy starting in fiscal year 2010 (July 1, 2009).

Given the short timeline, the lack of 24 months of data to calibrate a risk adjustment model, and the lack of risk adjustment models specifically designed for the uninsured population, the Connector had to choose the most appropriate model from a set of existing risk adjustment models. They faced two basic questions: (1) Which population does the uninsured resemble more in terms of disease profiles, healthcare cost, and utilization—commercial or Medicaid?; and (2) Which model should be used for risk adjustment and how?

After a set of rigorous comparisons and analyses, the Connector selected a diagnosis-based risk adjustment model that was calibrated on commercial experience because it seemed to have a better fit overall than a model calibrated on Medicaid managed care experience. This model was then used in managed care procurement for fiscal years 2010 and 2011. Starting in fiscal year 2012, the Connector will be using a diagnosis-based risk adjustment model specifically calibrated to CommCare experience. This addresses the pent-up demand issue among the formerly uninsured members, as well as the high rate of turnover within the program. Both of these considerations likely will be salient features of the future health insurance exchanges in other states.

Not every state is similar to Massachusetts, but the experience suggests that risk adjustment can be applied to the uninsured and better modeling techniques can help address the unique characteristics of an exchange.

Accountable care organizations

While risk adjustment has been used in setting payment rates in public programs for quite some time, risk adjustment for provider payment has been relatively recent, especially in accountable care organizations (ACOs) and patient-centered medical home programs among private payors.[40]

For instance, Blue Cross Blue Shield of Massachusetts (BCBSMA) introduced a provider payment reform program, called the Alternative Quality Contract (AQC), in January 2009. The AQC is a global payment model that combines inflation and risk adjustment capitation payments with performance-based incentive payments.[41] A number of Blue Cross and Blue Shield health plans are also rolling out accountable care organization programs, such as Blue Cross Blue Shield of Illinois and Blue Shield of California.

CareFirst BlueCross BlueShield uses risk adjustment to determine global payments in its patient-centered medical home (PCMH) program.[42] Capital District Physician Health Plan, a large physician-owned health plan in Albany, New York, also uses risk adjustment in PCMH, although only to adjust "primary care activity levels" and use of the emergency department.

Risk adjustment mechanisms like those discussed above operate on populations that are typically smaller than a health plan. As such, there may be considerable uncertainty involved in the risk adjustment calculations, and the results of this study may be of keen interest to ACOs and similar risk adjustment programs.

[40] The Center for Medicare and Medicaid Innovation, in its request for applications, has chosen to stay away from diagnosis-based risk adjustment. This reflected CMS's concern that risk scores may increase, which would be due more to changes in coding than to actual changes in patient's health status. See http://innovations.cms.gov/wp-content/uploads/2011/05/Pioneer-ACO-RFA.pdf.

[41] Blue Cross Blue Shield of Massachusetts, the Alternative Quality Contract: http://www.bluecrossma.com/visitor/about-us/making-quality-health-care-affordable.html

[42] CareFirst BlueCross BlueShield. Patient-Centered Medical Home. Program Information. Retrieved May 16, 2012, from https://provider.carefirst.com/wps/portal/Provider/PCMH?WCM_GLOBAL_CONTEXT=/wcmwps/wcm/connect/Content-Provider/CareFirst/ProviderPortal/PCMH/Tab/pcmhProgramInformation.

Appendix C: The value of accuracy

In this section we present a discussion aimed at quantifying the *value* of an increase in model accuracy. Value is a somewhat subjective term. For example, higher accuracy may result in more buy-in of a risk adjustment approach, which is not quantifiable but an important outcome. However, in the opinion of the authors and echoed by others at industry meetings, there is uncertainty around how increasing the accuracy of risk assessment models impacts business functions. Following is a qualitative discussion around how one might connect accuracy metrics such as R-Squared to business actions (e.g. rating action in underwriting). As such, this section is intended to provoke ideas and discussion among practitioners—and hopefully lead to more research in this area.

The table in Figure 23 presents accuracy metrics by group size for the standard model (i.e., the CMS-HCC model without constraining elements applied such as partial eligibility, lag, turnover, etc.). We see that at an individual level the R-Squared for the model is 12.3%. This compares reasonably with the 12.5% value reported in 2011 by the team evaluating the HCC model (Gregory C. Pope, 2011). The difference may be attributable to variations in population sampling methodology, including the data time window.

Initially somewhat surprising, the R-Squared value does not seem to vary that much by group size. One may suspect that the value should go up, because costs become more predictable as group size increases. However, R-Squared measures the *relative* variation in the dependent variable, relative to the average of the dependent variable. So you can think of it this way—how much better is using a risk assessment tool versus simply using the average of the dependent variable (i.e., 1.00 for normalized cost)? The general formula for R-Squared is:

$$R^2 = 1 - \frac{SS_{err}}{SS_{tot}} = 1 - \frac{\sum_i^n (y - \hat{y})^2}{\sum_i^n (y - \bar{y})^2}$$

As group size increases, the difference between predicted and actual cost (numerator) tends to decrease, however so does the difference between average actual cost and average cost (denominator). So there is a competition in terms of which term decreases faster. For randomly simulated groups from a certain population, it turns out that, as the number of bootstrapped samples increases, R-Squared at any group size tends to the value measured over all of the individuals in the population. This conclusion may be at odds with the experience of many practitioners who have experienced much higher R-Squared values with their applications on groups. The explanation is that for *randomly* simulated groups the group R-Squared tends to the same value as for individuals. However, as we see in the chart in

Figure 23, it only takes a very small amount of non-randomness (i.e., members with similar risk) to dramatically increase performance on group accuracy measures.

$$\text{MAPE} = \frac{\sum_i^n |y - \hat{y}|}{n}$$

The mean absolute prediction error however decreases sharply as group size increases. The chart in Figure 24 shows this effect, with a power-law relationship between MAPE and group size.

Figure 23: Accuracy Metrics for Standard Model Predictions

Group Size	R^2	MAPE
1	12.3%	0.9579
2	12.3%	0.7888
5	12.2%	0.5730
25	12.4%	0.2877
50	12.5%	0.2078
250	12.0%	0.0964
1,000	12.6%	0.0485
5,000	11.0%	0.0216

The table in Figure 24 shows accuracy statistics by various prediction models and at selected group sizes. It shows that demographics alone do not make a very good predictor of cost in Medicare data, and that turnover, lag, and partial eligibility all affect accuracy—in roughly decreasing order of impact.

Figure 24: Mean Absolute Prediction Error by Various Models and Group Size

Predictions	R^2	Grp: 1	Grp: 5	Grp 50	Grp 5k
1: Demo Only	0.5%	1.0817	0.6232	0.2240	0.0232
2: Standard	12.3%	0.9579	0.5730	0.2078	0.0216
3: Lag-1Q	10.2%	0.9728	0.5811	0.2128	0.0219
4: Lag-2Q	8.9%	0.9798	0.5842	0.2140	0.0222
5: Elig-9Mo	12.3%	0.9584	0.5702	0.2115	0.0220

Predictions	R^2	Grp: 1	Grp: 5	Grp 50	Grp 5k
6: Elig-6Mo	12.1%	0.9617	0.5706	0.2085	0.0214
7: Elig-3Mo	11.6%	0.9725	0.5757	0.2115	0.0219
8: Turnover-10%	11.0%	0.9687	0.5788	0.2096	0.0221
9: Turnover-30%	9.0%	0.9940	0.5891	0.2149	0.0223
10: Quality-Inp	12.3%	0.9560	0.5719	0.2090	0.0217
11: Quality-Out	12.3%	0.9579	0.5706	0.2111	0.0216
12: Quality-Prof	9.0%	0.9907	0.5854	0.2125	0.0222

If one is able to increase accuracy of risk adjustment from, say, 10% to 12%, what is the *value* of that increase?

Much has been said on the subject of accuracy in risk adjustment. In fact it has been the focus in development efforts in the absence of other significant objective measures for a basis of comparison among the various available tools. However if we spend an extra $*x* to develop/purchase an improvement of *y*% in risk score, do we think we know what the return on that investment is?

This is tricky to quantify, but it is important to think through if we are to have a meaningful discussion of why accuracy is important in healthcare risk adjustment. We may need to develop some new tools to allow us to put a value on accuracy.

The key is to first create a link between measurement of accuracy and the business actions that are taken. Take underwriting for example. Typically premiums are not developed as a continuum but as discrete values for a limited number of tiers. However, accuracy is measured over individual predictions that represent a wide range of values. A disconnect exists between how we measure accuracy and how predictions are utilized. We can develop a new type of score that is more representative of how improving predictions at the level of an individual affects the business decisions that are made over a block. We call it a *tier score*.

The table in Figure 25 shows a 4x4 grid that reflects four underwriting tiers. These could be more or less than four without any loss in generality. In this simplistic example, going across the top, the numbers 1-4 represent the quartiles of actual cost. Going down the grid, they represent quartiles of predicted cost. The values in the grid represent our preferences for the individuals falling in each of the cells. For example the diagonal is fully (i.e., 100%) preferred. These risks are well-priced. Above the diagonal, the preferences fall sharply as these individuals were predicted to be low-risk, but actually were more

costly. Loss ratios are higher and may represent negative adjustments for the plan. Below the diagonal the preferences still fall, but not as sharply. Here we predicted individuals to be higher-risk than actual, so premiums are expected to come in higher than actual cost. The premiums set on the basis of this risk assessment tool may not be competitive, and therefore the preferences are lower than 100%.

Figure 25: Preferences for Various Misclassifications of Risk

		Actual			
		Q1	**Q2**	**Q3**	**Q4**
Predicted	**Q1**	100%	60%	30%	0%
	Q2	70%	100%	60%	30%
	Q3	65%	70%	100%	60%
	Q4	45%	65%	70%	100%

We can summarize the number of individuals or groups that fall into each of the cells above using a risk assessment method. For example, the table in Figure 26 summarizes individuals that were scored using a standard application of the HCC model.

Figure 26: Summarizing Individuals by Predicted and Actual Quartiles (standard model)

		Actual			
		Q1	**Q2**	**Q3**	**Q4**
Predicted	**Q1**	120,775	68,715	46,741	25,456
	Q2	72,261	70,852	56,890	38,663
	Q3	41,291	69,173	74,026	65,381
	Q4	14,191	42,304	72,691	120,590

We can now calculate a tier score. Using the formula below (simply a weighted average of the preferences by the summarized individuals/groups), the tier score is 73.7%.

$$Tier\ Score = \sum_i^{Tiers} x_i p_i \Big/ \sum_i^{Tiers} x_i$$

For comparison, Figure 27 is a grid showing individuals that are summarized using an age/gender-factor risk assessment approach. We see fewer (25%) individuals along the diagonal. The tier score is 67.7%.

Figure 27: Summarizing Individuals by Predicted and Actual Quartiles (demographic model)

		Actual			
		Q1	**Q2**	**Q3**	**Q4**
Predicted	**Q1**	68,507	56,500	48,527	39,908
	Q2	78,929	71,352	67,526	61,937
	Q3	47,981	52,711	56,984	56,472
	Q4	54,122	69,348	77,398	91,798

The difference in the R-Squared values for the HCC and the age/gender approaches is stark at 12.3% and 0.5% respectively. However, the tier scores are closer. This reflects a more general principle that the more limited rating action you can take based on a risk assessment tool, the less material are the differences in R-Squared. If you layer on the limitations on the variation in premium by tiers, then you may get even closer scores.

Note that we still have not placed a "dollar value" on accuracy. We are now close, and can use the average difference between premium and cost in each of these cells in order to calculate the net effect of rating based on the risk assessment method. We assume the following differences by each cell. These differences assume that the average cost for Q1-Q4 is {$200, $240, $288, $345}. Therefore, for a predicted quartile of 1 but an actual of 4, the difference is $200 - $345 = -$145.

Figure 28: Net Effect of Rating

		Actual			
		Q1	**Q2**	**Q3**	**Q4**
Predicted	**Q1**	$0.00	-$40.00	-$88.00	-$145.00
	Q2	$40.00	$0.00	-$48.00	-$105.00
	Q3	$88.00	$48.00	$0.00	-$57.00
	Q4	$145.00	$105.00	$57.00	$0.00

We can think of this grid as placing a dollar value on the classification of individuals based on risk score and where their costs actually ended up. We can multiply this grid with the individual-level summary for the HCC model, and the result is about -$600,000. Upon multiplying this grid with the summary from an age/gender-only model, the result is about $4.2 million.

So while the R-Squared is hugely superior to the age/gender method (12.3% vs. 0.5%), the *tier score* is somewhat superior (74% vs. 68%); the *tier value* reverses the equation with age/gender-based rating producing a much more profitable result. This result is due to us not placing a "profit" value on the diagonal. We assume that the result here is zero (premium = claims). Of course this is simplistic, and we can refine our net cost grid by including a 12% administration/profit load.

Figure 29: Tier Values

		Actual			
		Q1	**Q2**	**Q3**	**Q4**
Predicted	**Q1**	$24.00	-$16.00	-$64.00	-$121.60
	Q2	$68.80	$28.80	-$19.20	-$76.80
	Q3	$122.56	$82.56	$34.56	-$23.04
	Q4	$187.07	$147.07	$99.07	$41.47

The results then become about $32 million (CMS-HCC) versus $37 million (age/gender). This is hardly an improvement. The reason is that while placing some profit on the diagonal helped the HCC model,

administration/profit is also earned off the diagonal and the age/gender model produces many more predictions below the diagonal. In reality, quoting uncompetitive prices is not good business. We need to temper our enthusiasm for the age/gender model by dampening the profitable results below the diagonal with assumptions regarding the take-up rate in a particular cell. For example, we may assume that only 10% of individuals that will be Q1 (i.e., are healthy) but are rated as Q4 (i.e., most expensive tier) will take the premium offer. Similarly, we assume that 100% of individuals that will be Q4 but are rated as Q1 will take the offer. The table in Figure 30 shows these preferences (identical to the preference table in Figure 29, with values above the diagonal set to 75% in this case).

Figure 30: Preferences by Tiers

		Actual			
		Q1	**Q2**	**Q3**	**Q4**
Predicted	**Q1**	75%	85%	95%	100%
	Q2	40%	75%	85%	95%
	Q3	20%	40%	75%	85%
	Q4	10%	20%	40%	75%

We multiply the tier value results with these preferences. The results are $7.2 million for the HCC model and $3.1 million for the age/gender-only model. These figures can be thought of as the *value* of a risk classification algorithm, and using this process we can put a dollar amount on an increase in accuracy.

There are several simplifying assumptions made in the process above (not to mention the difficulty in setting assumptions around take-up rates), but in general the discussion provides a much richer evaluation of accuracy than a number like 12.3%—with no intrinsic value except as a comparative number. Even the value as a comparative number is suspect as there is no guaranteeing that a higher R-Squared will produce a better business result, as we have seen in the development above.

It may be possible to generalize the principles discussed above to other applications using risk assessment. The key is linking an accuracy measure to specific business decisions that can be made based on the results of risk assessment.

Appendix D: Data and software

This section describes the data and software used in the analysis.

D.1 Medicare FFS 5% sample database

The Centers for Medicare and Medicaid Services (CMS) is responsible for administering the Medicare program, and in this process aggregates information on Medicare beneficiaries and claims. In preparation of making them available for purchase the files are stripped of data elements that may identify beneficiaries. Only 5% of the data is made available, and this sample is created based on selecting records with the numerals 05, 20, 45, 70, or 95 in positions 8 and 9 of the health insurance claim (HIC) number.[43] Claim data is organized into separate files by types of services, including home health agency, durable medical equipment, hospice, inpatient, outpatient, physician, and skilled nursing facility claims. Diagnosis and cost information from all of these files was aggregated and used for purposes of risk scoring and construction of confidence intervals for the selected enrollees.

D.2 CMS-HCC risk adjustment software

The report uses the 2011 Centers for Medicare and Medicaid Services hierarchical condition category (CMS-HCC) model. The model is based upon the diagnostic cost groups (DCG)/HCC model, which is similar to the principal inpatient diagnostic cost group (PIP-DCG) that was developed with CMS funding by researchers at RTI International and Boston University, with clinical input from physicians at Harvard Medical School (Pope, 2004).

The high-level operation of the risk adjuster is as follows. The HCC model classifies diagnosis codes into approximately 800 *diagnostic groups*, and these are further aggregated into 189 condition categories (CCs). A person may receive multiple related CCs, and therefore hierarchies are imposed such that only the most severe manifestation of the related CCs is indicated for the person. In the 2011 model, only about 70 HCCs are actually used and imposition of hierarchy occurs among 12 CCs.

[43] Centers for Medicare and Medicaid Services (2011). Limited Data Set (LDS) Files. Research, Statistics, Data and Systems. Retrieved May 16. 2011. from https://www.cms.gov/LimitedDataSets/12_StandardAnalyticalFiles.asp#TopOfPage.

Appendix E: Calculation of empirical confidence intervals

E.1 Bootstrapping and convergence

In order to calculate confidence intervals for the risk score statistic, we need a way to figure out the density function of the error term. Bootstrapping offers a simple and effective way to accomplish this. The idea is that a drawn sample is representative of the entire population. Resampling from this sample represents a distribution that we would obtain if we were to take repeated samples from the population itself. This bootstrap distribution (from resampling) represents the sampling distribution (distribution based on all possible samples of a given size from a given population) of a statistic.

Let's ground this concept in terms of thinking through an example in the context of risk scoring. Say you have 1,000 members that you calculate a risk score for using a certain model. You also have the actual costs for these members and thus you can subtract off the predicted from the actual to calculate the error term. Now you wish to estimate the distribution of the error term. You can do so by observing this distribution over the 1,000 members that you have. Very few situations present actuaries with a closed system. New members enter and old ones leave. Assume the population to be all possible individuals from which the 1,000 members are drawn. Now you can sample individuals from this population, with replacement, and estimate the error distribution over the entire (theoretical) population.

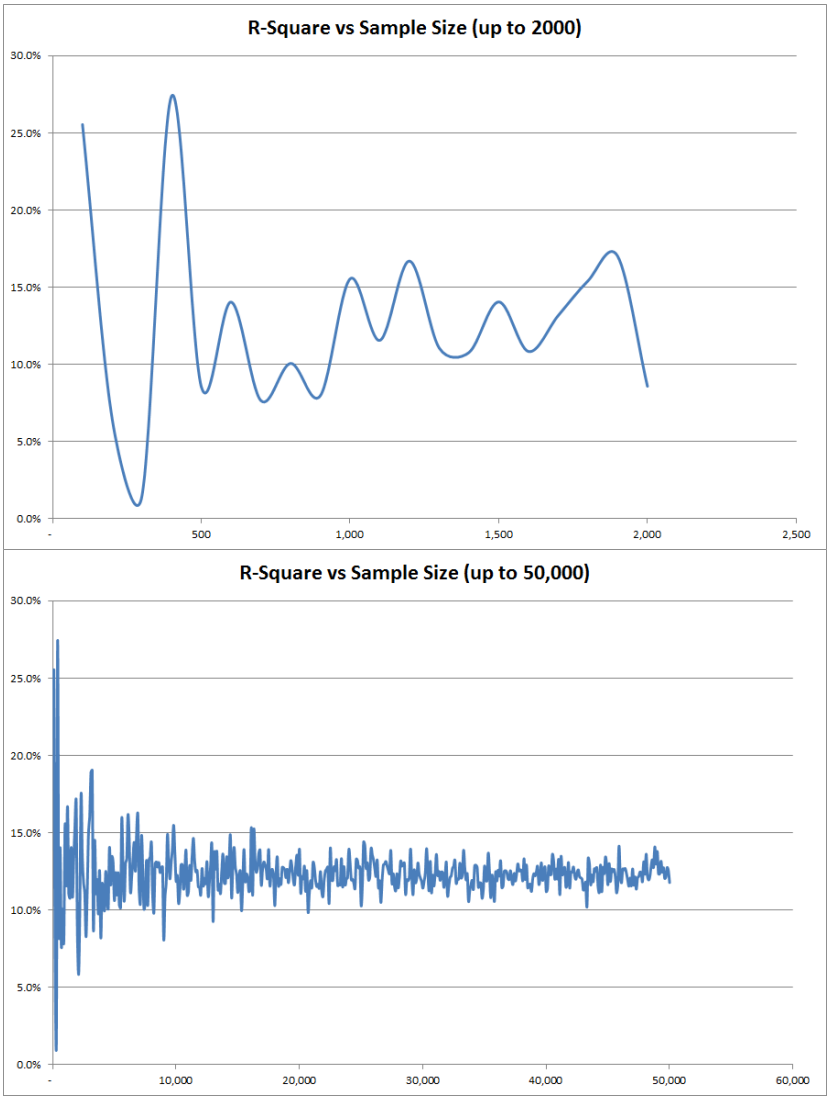
Bootstrapping is a very simple procedure without many parameters, except a key one—the number of repeated samples that are taken. The usual guideline is "take as many as feasible." With advances in computing, the number of samples taken for research studies has consistently gone up. One idea that may help determine the "right" number of resamples is to keep on sampling until the statistic "stabilizes," such that the variation in its value becomes small as more and more samples are taken. For lack of a better term, we refer to this concept as *convergence*.

In order to use this idea in the context of our research, we specify convergence as the number of bootstrapped samples such that the incremental variation in the estimated statistic is less than 5%. We looked at variation in R-Squared in the context of convergence, as we know that, for large enough bootstrapped samples, the R-Squared would tend to the same value as measured over the individual population (e.g. 12.3% for the HCC standard model). In the chart in Figure 31, we see R-Squared[44] plotted against the number of bootstrapped samples. We see an incredibly large variation in R-Squared

[44] The R-Squared value is calculated separately for each sample size.

for smaller bootstrapped samples, such that this value could be anywhere from over 15% to below 10% even for bootstrapped samples as large as 2,000 members. The value begins to stabilize (relatively speaking) after 100,000 member samples. We selected individual-level bootstraps at 1 million, more than we needed to,[45] but enough to make us less susceptible to sampling bias.

Figure 31: R-Squared vs. Sample Size



[45] We assume that, if the fluctuations in the R-Squared statistic stabilize to below 5%, then the convergence criterion has been met. This starts to happen around 100,000 members.

The chart in Figure 31 also serves as an important cautionary tale. Accuracy statistics such as R-Squared are widely cited, and users will expect a similar level of performance on their data sets as advertised by a model vendor or discussed in a research study. However, there is *uncertainty* in the accuracy of a risk assessment tool for "smaller" samples. The size of the sample needed for convergence varies with group size. For example, while 100,000 members were needed for R-Squared convergence, only 75,000 groups of size 2 are needed for the R-Squared to stabilize to its true value. As stated above, we define stabilization when the R-Squared value does not change by more than 5% as we take repeated randomized samples at that sampling size. We need to understand the concept of the convergence of accuracy statistics in order to have appropriate expectations regarding accuracy when applying a risk assessment tool.

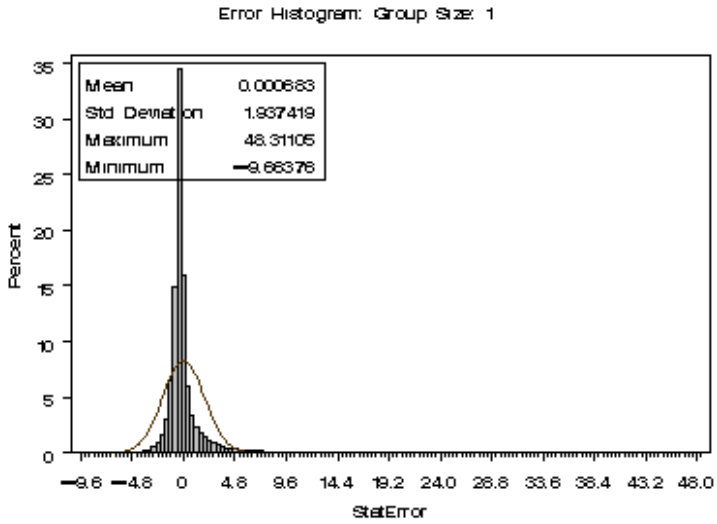
E.2 Empirical confidence interval construction

The method for calculating confidence intervals presented in this paper is inspired in large part by a 1971 paper by W.H. Williams and M. L. Goodman (W. H. Williams, 1971). Comparing the predicted risk score to actual expenditure provides us with an empirical distribution of the prediction error. This distribution can then be used to specify confidence limits for subsequent applications of the risk assessment tool.

For an individual, the error term is simply the actual less the predicted risk score. We can then take percentiles of the empirical distribution of the error terms to develop confidence intervals. For example, we can take the 5th and 95th percentiles as limits of a 90% confidence interval. The chart in Figure 32 shows a histogram developed from the error term for the standard HCC model and at the individual level.[46]

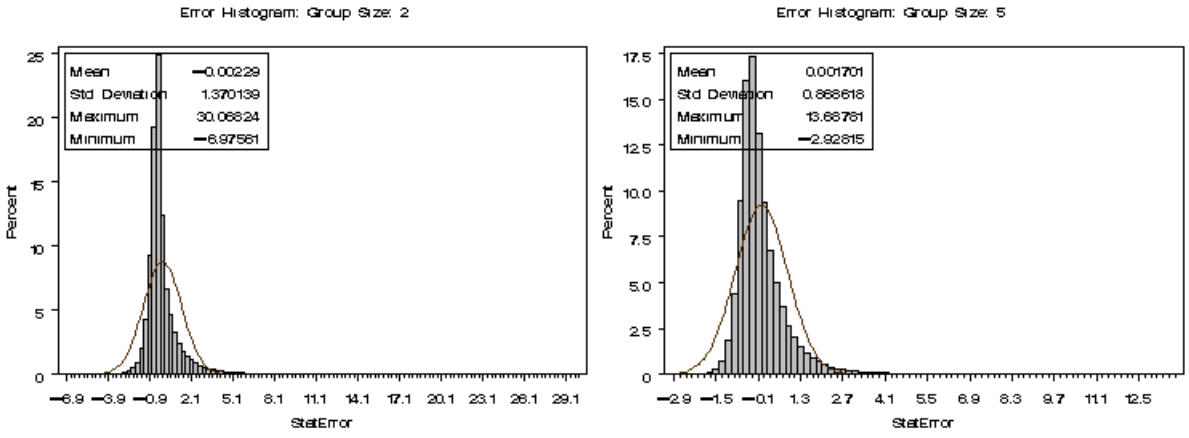
[46] Using Medicare FFS data with filters applied, as described in Section 4.1.

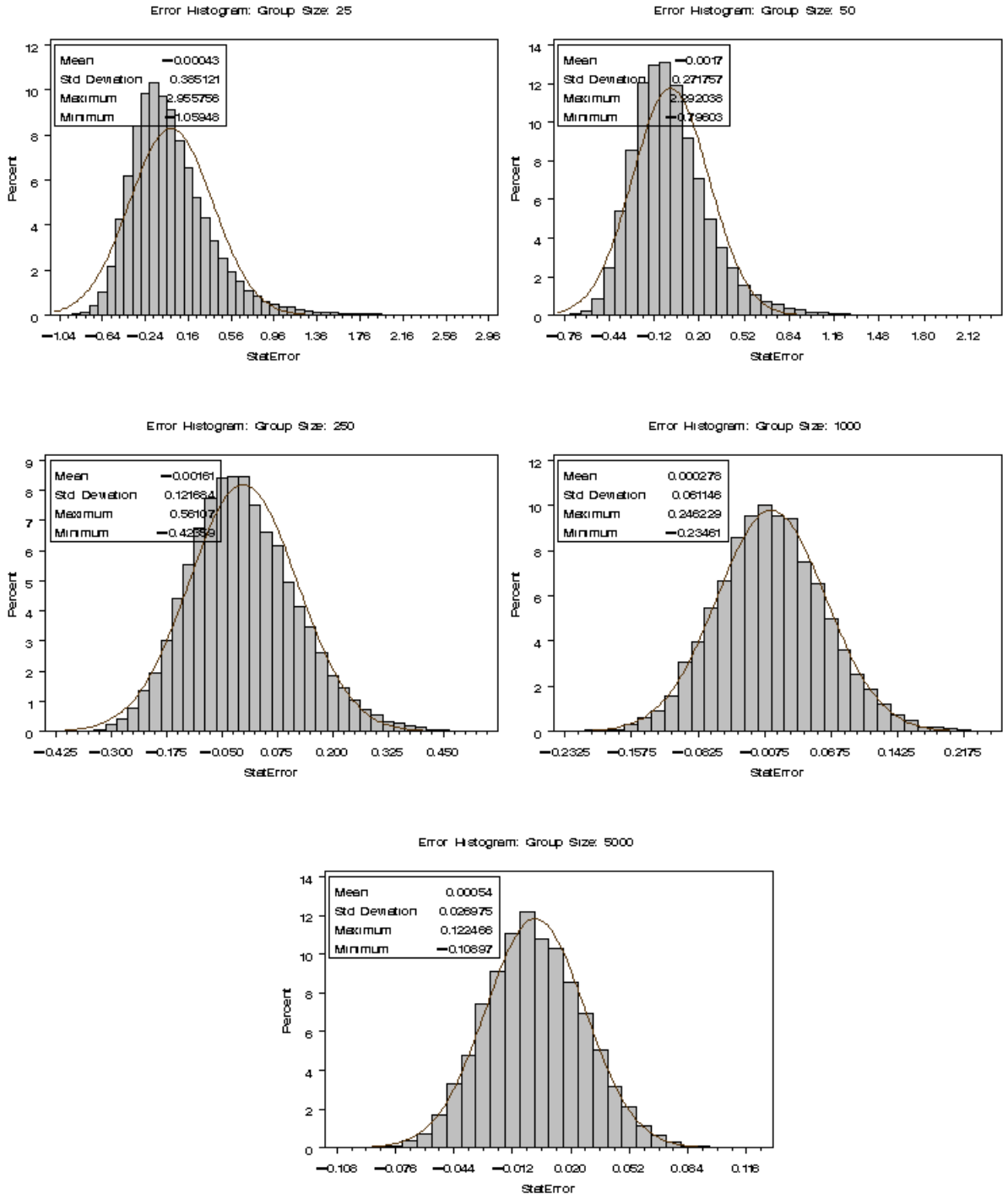
Figure 32: Error Histogram: Group Size: 1



The chart in Figure 33 shows histograms of the error term for various group sizes. We observe that the error term increasingly becomes normally distributed as group size increases.

Figure 33: Error Histograms by Group Sizes





A discussion of a technique is incomplete without describing its suitability over alternative approaches. An obvious alternative would be to construct a *theoretical* confidence interval instead of an *empirical* one.

For a single individual it may be possible to compute the confidence intervals using results from simple linear regression[47] using the equations below. Note that these equations are for a simple linear regression with only *one* predictor.[48] The calculations get considerably more complicated with multiple variables, and a typical risk assessment model has a large number of predictors (50+).

The 100% confidence interval (1-α) on (A) coefficient β and (B) predicted value (y_p) can be expressed as:[49]

$$(\mathrm{A})\beta \pm t_{\frac{\alpha}{2},n-2} \times \mathrm{StandardError}(\beta), (\mathrm{B})\ \widehat{y_p} \pm t_{\frac{\alpha}{2},n-2} \sqrt{\hat{\sigma}^2 \left[1 + \frac{1}{n} + \frac{\left(x_p - \bar{x}\right)^2}{\sum_i^n \left(x_p - \bar{x}\right)^2}\right]}$$

Where $t_{\frac{\alpha}{2},n-2}$ is obtained from a *t* distribution with *n*-2 degrees of freedom and x_p is the value of the *p*th predictor.

Note that equation (B) is used for calculating confidence intervals for *new* values (i.e., not for data used in developing the model). Equation (A) could quantify uncertainty in a calculated *risk* coefficient (for simple regression with a single predictor).[50]

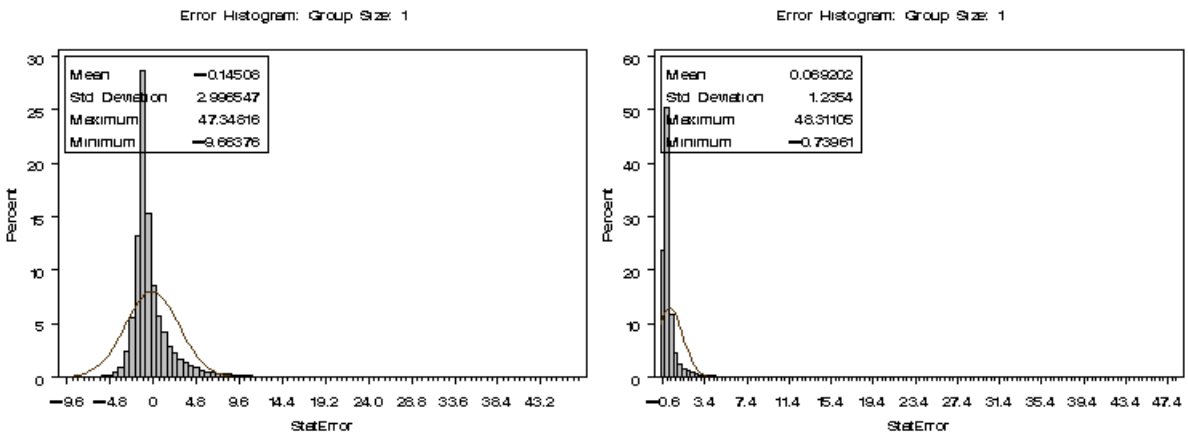
Confidence intervals constructed using theoretical results from linear regression depend on certain assumptions. These are:

- **Linearity of relationship**: This relationship is not necessarily true when trying to predict actual costs from an array of binary indicators based on some clinical grouping logic. In fact, it is likely *not true* with low R-Squared values supporting this assertion.
- **Error terms are homoscedastic**: Error terms are not homoscedastic in risk assessment. The error term varies with the input array of binary indications. For example, the histograms in Figure 34

[47] Most of the commercial risk adjustment tools use regression methods, and practitioners developing their own adjusters almost invariably use *linear* regression-based approaches.
[48] For ease in readability/understanding without loss of generality.
[49] Source: weibull.com
[50] As a side note, differentials of risk in populations are typically explained in terms of the prevalence of certain medical conditions. This relies upon the accuracy and precision of the model risk coefficients associated with those conditions. This uncertainty typically does not receive much attention in actuarial work; however, it becomes important when recalibrating models where typically one looks at the significance levels associated with the coefficient weight, but not the confidence intervals.

are for error terms when the predicted score is greater than 1.25 and when it is less than 0.75, respectively. There is a marked difference in standard deviation between the two distributions.

Figure 34: Error Terms for Predicted Scores



- **Error terms are normally distributed**: As seen above in Figure 32, the histogram for an individual, the error terms are clearly not normally distributed. While error terms look more normally distributed for groups, risk assessment models are invariably built using individual data (and group risk score is obtained by first calculating the risk score for individuals).
- **Data used for fitting vs. application**: Typically risk models are not fitted on the data they are applied to. This means that the "offered" risk weights thus used may have been developed using data with very different characteristics. As such, theoretical confidence intervals, even if possible to calculate, will not serve us well.
- **Group mean risk confidence intervals**: Even if the serious problems above could be overcome, it is mathematically difficult to provide exact and simple expressions for group-level confidence intervals from individual ones.

Because of the reasons described above, theoretical confidence intervals do not perform well in practice (W. H. Williams, 1971) and using an empirical estimation procedure (e.g. *kernel density estimation*) is more appropriate.

E.3 Kernel density estimation

In the previous section we proposed a simple approach for empirical calculation of confidence intervals (i.e., bootstrapping with percentile-based confidence intervals). Such empirically developed confidence intervals may give noisy results, especially when using smaller samples to develop them. These distributions need to be smoothed, and kernel density estimation (KDE)[51] provides a way to accomplish this.

KDE is a non-parametric method for estimating the density function of a distribution from empirical data through averaging a known density function (referred to as the *kernel*). The procedure used in this research is the PROC KDE method in SAS® software, and this method uses the Gaussian/normal kernel. The variance that is assumed for this kernel determines how smooth the resulting estimate is.

Literature suggests that, in some studies, confidence intervals developed using KDE can sometimes be more reliable than ones developed using an empirical method such as percentiles (Guerra, Polansky, & Schucany). Also, in some other situations, the extra computation may not be worth the effort (Masarotto, 1990). For example, at larger sample sizes, especially for larger-sized groups, there is not a great deal of difference between the two approaches. The table in Figure 35 compares the confidence intervals developed using percentile-based and KDE methods using the CMS-HCC model predictions. Because a very large number of bootstrapped samples were used, the percentile and KDE estimates are essentially the same.

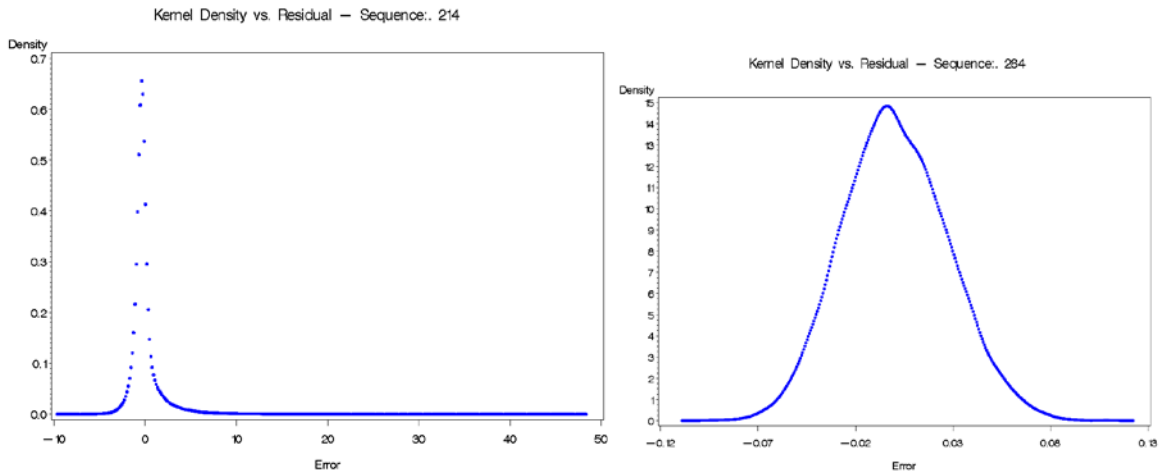
Figure 35: Comparing the KDE and Percentile Confidence Intervals for the Error Distribution

Group Size	Bootstraps	KDE	Percentile
1	1,000,000	{-1.6,2.81}	{-1.60,2.81}
2	500,000	{-1.25,2.21}	{-1.25,2.20}
25	35000	{-0.49,0.69}	{-0.49, 0.69}
250	20,000	{-0.19,0.21}	{-0.19,0.21}
1,000	15,000	{-0.097,0.1}	{-0.097,0.1}
5,000	10,000	{-0.042,0.046}	{-0.042,0.046}

[51] For more information on KDE, please review a text such as B.W. Silverman's *Density Estimation for Statistics and Data Analysis* (Silverman, 1986). This text used SAS software for KDE estimation. A description of the procedure from SAS can be found at: http://support.sas.com/documentation/cdl/en/procstat/63104/HTML/default/viewer.htm#procstat_univariate_sect038.htm.

We saw how the histograms for the standard model tended to a normal distribution with increasing group size. Below we have charts (for individual and for a group of 5,000) depicting the same tendency, but the empirical histograms are now replaced with smoothed KDE functions.

Figure 36: KDE vs. Residual



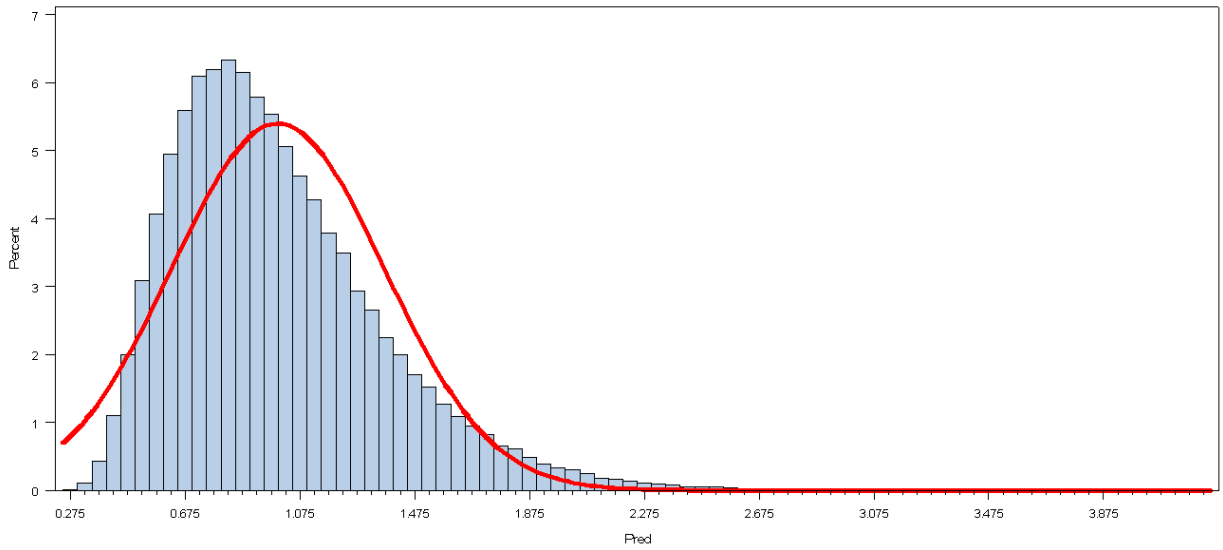
The conclusion of this section is that for a very large number of bootstrapped samples (as in this study), there may not be a need to perform the extra step of basing confidence intervals on smoothed KDE distributions. However, it is safer to always incorporate the use of smoothing functions (such as KDE) when developing confidence intervals.

E.4 Normality testing for group risk scores

As discussed in Section 2.3.1, one of the assumptions of the *t*-test is that the dependent variable is normally distributed. There are several options to choose from when testing normality of data. We present a simple visual testing of normality using (1) an empirical risk score distribution superimposed with a fitted normal distribution, and (2) a Q-Q plot. If the empirical distribution matches the theoretical (i.e., normal) distribution, then the points on a Q-Q plot lie on a linear pattern.

We find that risk scores appear normally distributed for groups of size 50 or larger. Figures 37-44 below show plots for group sizes 5, 25, 50, and 250.

Figure 37: Plot of Risk Score EDF and Assumed Normal Distribution, Group Size = 5*



* "Pred" shown in the chart is the predicted risk score.

Figure 38: Q-Q Plot, Group Size = 5

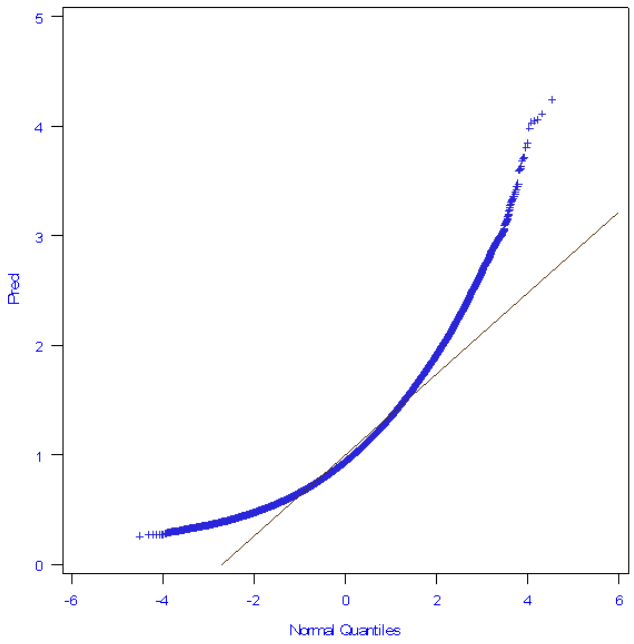


Figure 39: Plot of Risk Score EDF and Assumed Normal Distribution, Group Size = 25

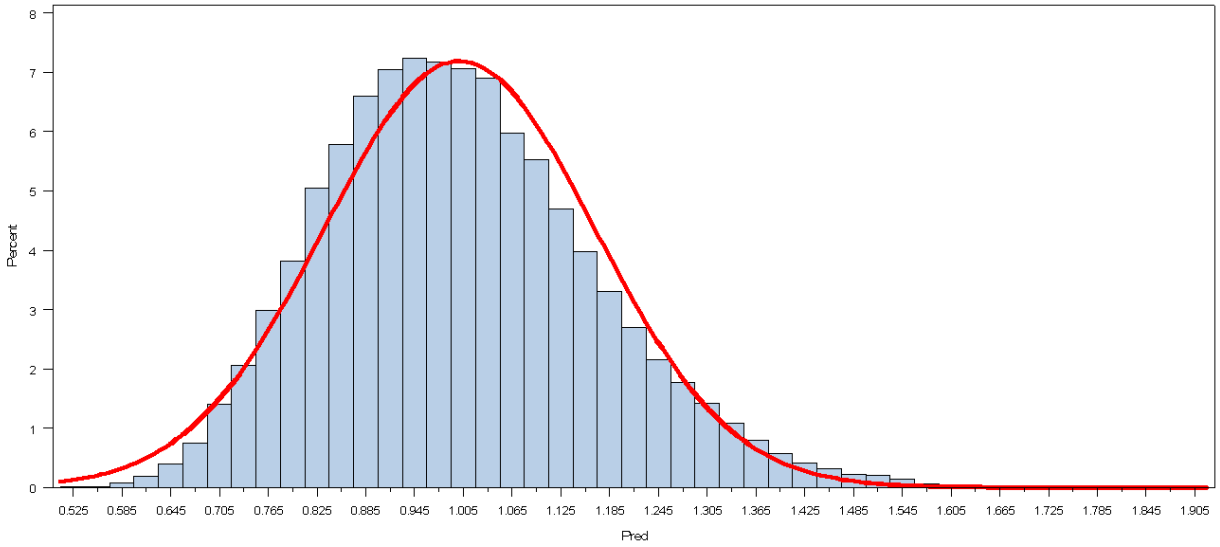


Figure 40: Q-Q Plot, Group Size = 25

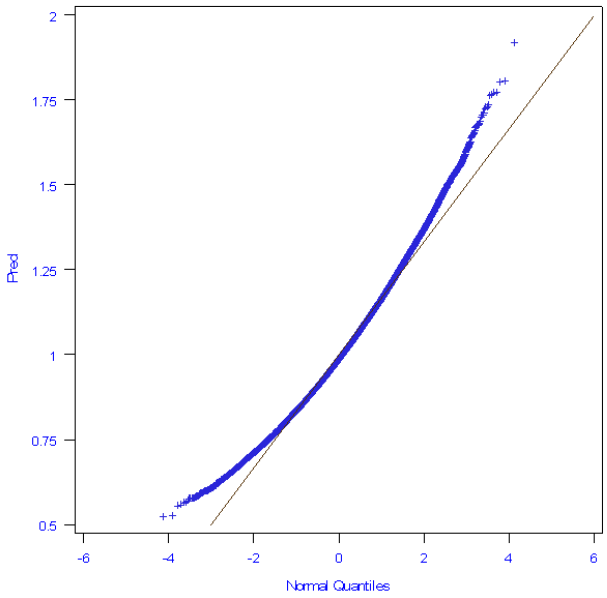


Figure 41: Plot of Risk Score EDF and Assumed Normal Distribution, Group Size = 50

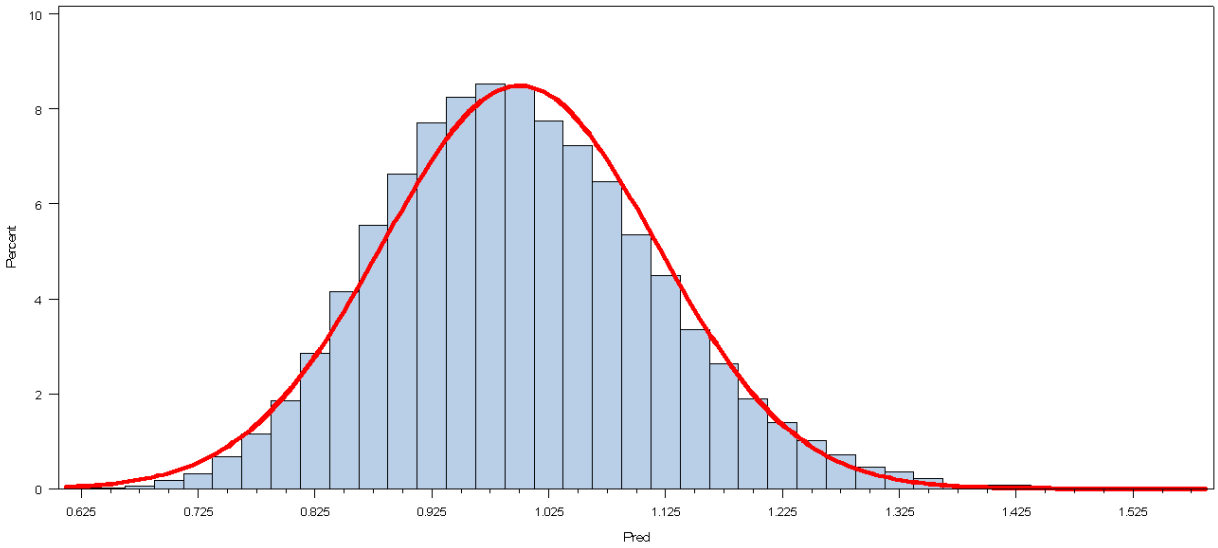


Figure 42: Q-Q Plot, Group Size = 50

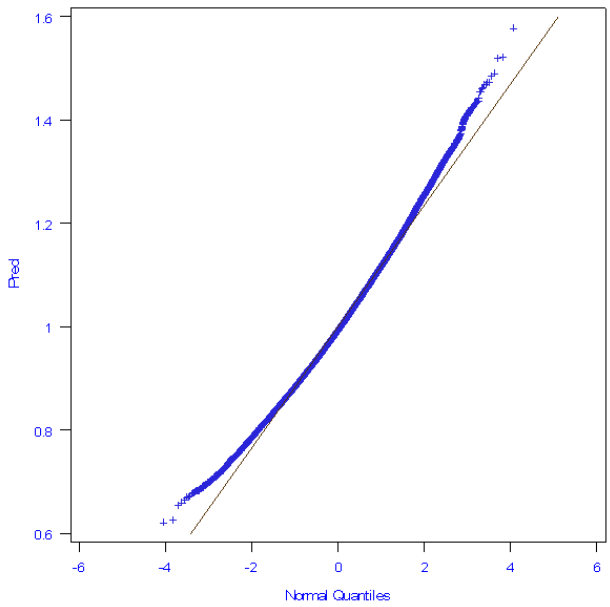


Figure 43: Plot of Risk Score EDF and Assumed Normal Distribution, Group Size = 250

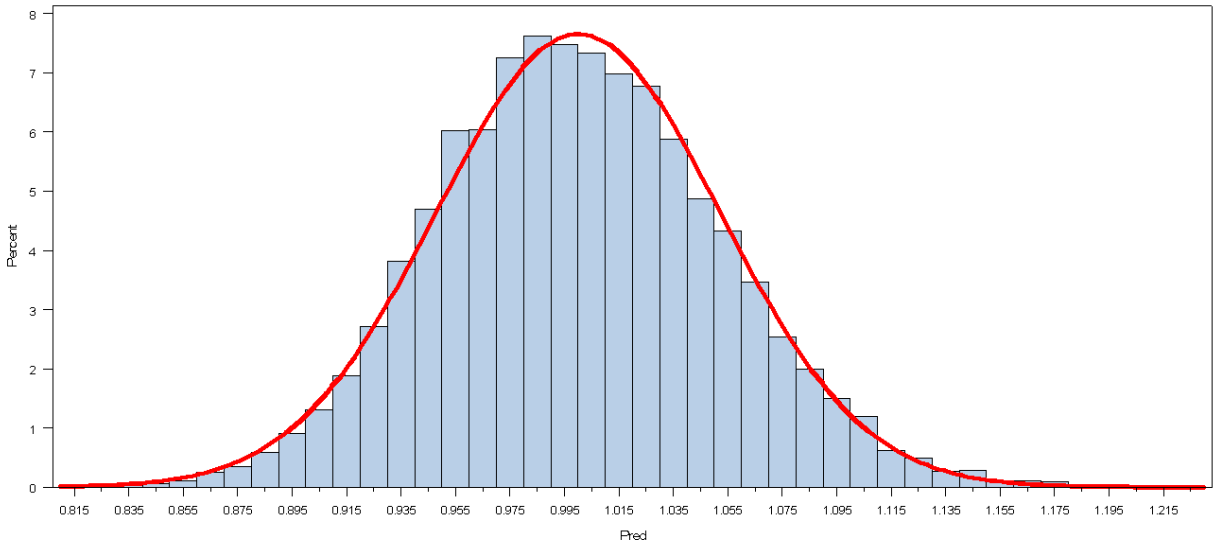
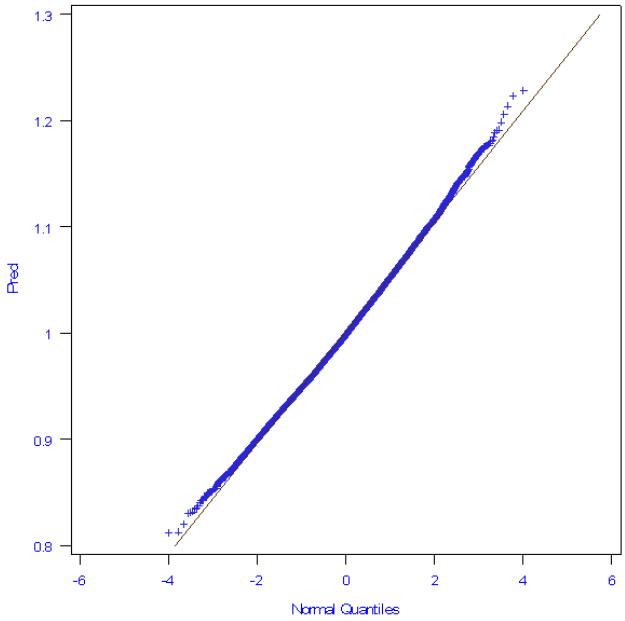


Figure 44: Q-Q Plot, Group Size = 250



Appendix F – Detailed results of the study

Standard Model: HCC Using CY2007 Claims

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.3%	0.9579
2	12.3%	0.7888
5	12.2%	0.5730
25	12.4%	0.2877
50	12.5%	0.2078
250	12.0%	0.0964
1,000	12.6%	0.0485
5,000	11.0%	0.0216

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.16,1.35}	{-1.6,2.81}	{-2.1,4.61}	0.8303	1.0017	2.0690	1.0024
2	All	{-0.97,1.24}	{-1.25,2.21}	{-1.54,3.34}	0.5869	1.0005	1.4632	0.9982
5	All	{-0.73,0.94}	{-0.89,1.51}	{-1.04,2.14}	0.3696	0.9990	0.9272	1.0007
25	All	{-0.41,0.48}	{-0.49,0.69}	{-0.57,0.94}	0.1665	1.0005	0.4114	1.0000
50	All	{-0.31,0.34}	{-0.37,0.49}	{-0.43,0.64}	0.1174	1.0002	0.2905	0.9985
250	All	{-0.15,0.16}	{-0.19,0.21}	{-0.22,0.26}	0.0521	1.0001	0.1297	0.9985
1,000	All	{-0.077,0.079}	{-0.097,0.1}	{-0.11,0.12}	0.0263	1.0000	0.0654	1.0002
5,000	All	{-0.033,0.036}	{-0.042,0.046}	{-0.05,0.055}	0.0116	1.0000	0.0286	1.0005
1	0-75th	{-0.73,1.02}	{-0.86,2.19}	{-0.96,3.63}	0.2754	0.6289	1.4259	0.6785
2	0-75th	{-0.71,1.06}	{-0.82,1.89}	{-0.91,2.83}	0.2522	0.7303	1.1109	0.7628
5	0-75th	{-0.61,0.86}	{-0.71,1.36}	{-0.79,1.92}	0.1991	0.8297	0.7736	0.8510
25	0-75th	{-0.38,0.46}	{-0.45,0.67}	{-0.51,0.89}	0.1078	0.9266	0.3764	0.9346
50	0-75th	{-0.29,0.34}	{-0.35,0.47}	{-0.4,0.62}	0.0792	0.9488	0.2684	0.9528
250	0-75th	{-0.14,0.16}	{-0.18,0.21}	{-0.21,0.26}	0.0367	0.9776	0.1236	0.9785
1,000	0-75th	{-0.075,0.079}	{-0.096,0.1}	{-0.11,0.13}	0.0190	0.9888	0.0630	0.9905
5,000	0-75th	{-0.032,0.037}	{-0.041,0.046}	{-0.049,0.055}	0.0084	0.9950	0.0277	0.9964
1	75th-90th	{-1.47,2.03}	{-1.6,3.78}	{-1.7,5.67}	0.2156	1.5650	2.3460	1.4724
2	75th-90th	{-1.24,1.63}	{-1.35,2.74}	{-1.43,4}	0.1479	1.4701	1.6487	1.3931
5	75th-90th	{-0.93,1.11}	{-1.03,1.79}	{-1.1,2.56}	0.0840	1.3253	1.0224	1.2855
25	75th-90th	{-0.48,0.52}	{-0.56,0.76}	{-0.62,1.03}	0.0331	1.1557	0.4263	1.1393
50	75th-90th	{-0.34,0.36}	{-0.41,0.54}	{-0.47,0.72}	0.0221	1.1106	0.2975	1.0988
250	75th-90th	{-0.16,0.16}	{-0.2,0.22}	{-0.23,0.27}	0.0095	1.0496	0.1275	1.0440
1,000	75th-90th	{-0.079,0.078}	{-0.1,0.1}	{-0.12,0.12}	0.0047	1.0247	0.0618	1.0214
5,000	75th-90th	{-0.035,0.033}	{-0.046,0.044}	{-0.052,0.055}	0.0021	1.0109	0.0271	1.0089
1	90th-100th	{-2.76,3.33}	{-3.28,6.02}	{-3.84,9.22}	0.9598	2.9557	3.9010	2.7293
2	90th-100th	{-1.92,2.27}	{-2.21,3.89}	{-2.54,5.95}	0.5546	2.3231	2.4601	2.1716
5	90th-100th	{-1.22,1.38}	{-1.38,2.24}	{-1.52,3.29}	0.2758	1.7785	1.3292	1.6955
25	90th-100th	{-0.55,0.52}	{-0.64,0.81}	{-0.72,1.11}	0.0902	1.3217	0.4657	1.2816
50	90th-100th	{-0.39,0.37}	{-0.45,0.56}	{-0.51,0.75}	0.0594	1.2204	0.3216	1.1911
250	90th-100th	{-0.17,0.16}	{-0.21,0.22}	{-0.24,0.25}	0.0239	1.0945	0.1284	1.0800
1,000	90th-100th	{-0.085,0.077}	{-0.1,0.11}	{-0.12,0.13}	0.0115	1.0468	0.0647	1.0414
5,000	90th-100th	{-0.038,0.034}	{-0.046,0.046}	{-0.054,0.057}	0.0052	1.0206	0.0274	1.0185

Lag: HCC Using CY2006-7 Less CY07 Q4

Accuracy Metrics

Group Size	R-Square	MAPE
1	10.2%	0.9728
2	9.8%	0.8041
5	10.5%	0.5811
25	10.2%	0.2918
50	10.4%	0.2128
250	10.2%	0.0983
1,000	10.1%	0.0491
5,000	10.8%	0.0219

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.18,1.38}	{-1.62,2.86}	{-2.12,4.68}	0.8205	1.0001	2.0722	1.0026
2	All	{-0.98,1.27}	{-1.27,2.28}	{-1.57,3.44}	0.5817	1.0001	1.4608	1.0021
5	All	{-0.74,0.96}	{-0.91,1.53}	{-1.06,2.18}	0.3661	0.9992	0.9308	1.0027
25	All	{-0.42,0.48}	{-0.5,0.71}	{-0.57,0.97}	0.1630	0.9998	0.4133	0.9989
50	All	{-0.31,0.36}	{-0.38,0.51}	{-0.44,0.65}	0.1181	1.0024	0.2922	1.0017
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.22,0.27}	0.0516	0.9999	0.1314	1.0005
1,000	All	{-0.078,0.08}	{-0.099,0.1}	{-0.12,0.13}	0.0262	0.9998	0.0652	0.9995
5,000	All	{-0.034,0.036}	{-0.044,0.046}	{-0.052,0.055}	0.0116	1.0002	0.0290	1.0006
1	0-75th	{-0.73,1.08}	{-0.86,2.3}	{-0.96,3.85}	0.2728	0.6314	1.5004	0.7014
2	0-75th	{-0.71,1.12}	{-0.82,1.99}	{-0.91,2.99}	0.2506	0.7322	1.1529	0.7851
5	0-75th	{-0.61,0.89}	{-0.71,1.41}	{-0.79,1.97}	0.1973	0.8315	0.7822	0.8630
25	0-75th	{-0.38,0.47}	{-0.46,0.69}	{-0.52,0.92}	0.1047	0.9274	0.3819	0.9393
50	0-75th	{-0.29,0.35}	{-0.36,0.5}	{-0.41,0.63}	0.0787	0.9504	0.2722	0.9592
250	0-75th	{-0.15,0.17}	{-0.18,0.22}	{-0.21,0.27}	0.0365	0.9776	0.1262	0.9817
1,000	0-75th	{-0.075,0.082}	{-0.096,0.1}	{-0.11,0.13}	0.0187	0.9886	0.0630	0.9902
5,000	0-75th	{-0.034,0.036}	{-0.043,0.047}	{-0.051,0.056}	0.0084	0.9953	0.0282	0.9964
1	75th-90th	{-1.47,2.04}	{-1.6,3.73}	{-1.7,5.64}	0.2130	1.5573	2.3260	1.4529
2	75th-90th	{-1.25,1.61}	{-1.36,2.79}	{-1.45,4.14}	0.1464	1.4665	1.6847	1.3851
5	75th-90th	{-0.94,1.11}	{-1.04,1.78}	{-1.11,2.56}	0.0836	1.3230	1.0288	1.2699
25	75th-90th	{-0.49,0.54}	{-0.56,0.81}	{-0.63,1.03}	0.0322	1.1519	0.4338	1.1281
50	75th-90th	{-0.36,0.37}	{-0.42,0.54}	{-0.47,0.69}	0.0227	1.1141	0.2962	1.0896
250	75th-90th	{-0.16,0.16}	{-0.2,0.22}	{-0.24,0.27}	0.0094	1.0486	0.1283	1.0415
1,000	75th-90th	{-0.084,0.078}	{-0.11,0.1}	{-0.12,0.14}	0.0047	1.0247	0.0640	1.0206
5,000	75th-90th	{-0.035,0.037}	{-0.045,0.047}	{-0.054,0.054}	0.0020	1.0111	0.0278	1.0098
1	90th-100th	{-2.82,3.05}	{-3.34,5.71}	{-3.89,8.79}	0.9474	2.9300	3.8017	2.5872
2	90th-100th	{-1.96,2.16}	{-2.27,3.75}	{-2.59,5.58}	0.5476	2.3105	2.3303	2.0565
5	90th-100th	{-1.26,1.3}	{-1.41,2.15}	{-1.54,3.27}	0.2686	1.7719	1.3473	1.6499
25	90th-100th	{-0.56,0.51}	{-0.65,0.79}	{-0.73,1.07}	0.0921	1.3149	0.4648	1.2523
50	90th-100th	{-0.4,0.38}	{-0.47,0.57}	{-0.53,0.73}	0.0612	1.2248	0.3267	1.1885
250	90th-100th	{-0.17,0.16}	{-0.21,0.22}	{-0.25,0.27}	0.0230	1.0935	0.1312	1.0792
1,000	90th-100th	{-0.087,0.071}	{-0.11,0.094}	{-0.12,0.11}	0.0111	1.0467	0.0617	1.0377
5,000	90th-100th	{-0.038,0.032}	{-0.048,0.042}	{-0.058,0.052}	0.0049	1.0208	0.0276	1.0179

Lag: HCC Using CY2006-7 Less CY07 Q3 & Q4

Accuracy Metrics

Group Size	R-Square	MAPE
1	8.9%	0.9798
2	9.0%	0.8074
5	8.9%	0.5842
25	9.0%	0.2937
50	9.1%	0.2140
250	10.1%	0.0988
1,000	9.2%	0.0492
5,000	10.0%	0.0222

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.19,1.39}	{-1.63,2.88}	{-2.14,4.7}	0.8158	0.9991	2.0732	1.0005
2	All	{-0.99,1.27}	{-1.28,2.28}	{-1.58,3.43}	0.5779	1.0004	1.4620	0.9995
5	All	{-0.75,0.95}	{-0.92,1.53}	{-1.08,2.19}	0.3659	1.0010	0.9209	0.9999
25	All	{-0.42,0.49}	{-0.51,0.71}	{-0.58,0.95}	0.1630	0.9993	0.4117	0.9975
50	All	{-0.32,0.36}	{-0.38,0.51}	{-0.44,0.67}	0.1163	1.0002	0.2931	1.0017
250	All	{-0.15,0.17}	{-0.19,0.22}	{-0.22,0.27}	0.0520	0.9999	0.1320	1.0006
1,000	All	{-0.077,0.081}	{-0.098,0.11}	{-0.11,0.13}	0.0259	1.0001	0.0650	1.0007
5,000	All	{-0.036,0.036}	{-0.046,0.046}	{-0.053,0.055}	0.0114	1.0000	0.0294	0.9997
1	0-75th	{-0.74,1.1}	{-0.87,2.35}	{-0.97,3.91}	0.2714	0.6338	1.5284	0.7105
2	0-75th	{-0.71,1.13}	{-0.83,2.02}	{-0.92,3.01}	0.2494	0.7342	1.1700	0.7912
5	0-75th	{-0.61,0.9}	{-0.72,1.43}	{-0.8,2.02}	0.1964	0.8334	0.7937	0.8699
25	0-75th	{-0.39,0.48}	{-0.46,0.69}	{-0.51,0.93}	0.1053	0.9270	0.3812	0.9408
50	0-75th	{-0.29,0.36}	{-0.35,0.51}	{-0.4,0.66}	0.0779	0.9491	0.2769	0.9619
250	0-75th	{-0.15,0.17}	{-0.18,0.22}	{-0.21,0.27}	0.0365	0.9775	0.1268	0.9823
1,000	0-75th	{-0.074,0.082}	{-0.094,0.11}	{-0.11,0.13}	0.0185	0.9890	0.0629	0.9920
5,000	0-75th	{-0.035,0.037}	{-0.046,0.047}	{-0.053,0.056}	0.0083	0.9951	0.0287	0.9955
1	75th-90th	{-1.47,2.07}	{-1.59,3.81}	{-1.69,5.81}	0.2089	1.5512	2.3765	1.4645
2	75th-90th	{-1.25,1.59}	{-1.36,2.77}	{-1.44,4.1}	0.1459	1.4627	1.6596	1.3683
5	75th-90th	{-0.95,1.09}	{-1.04,1.75}	{-1.11,2.51}	0.0826	1.3241	1.0287	1.2551
25	75th-90th	{-0.49,0.51}	{-0.57,0.74}	{-0.62,0.98}	0.0322	1.1512	0.4199	1.1196
50	75th-90th	{-0.36,0.36}	{-0.43,0.52}	{-0.49,0.67}	0.0229	1.1096	0.2953	1.0851
250	75th-90th	{-0.17,0.16}	{-0.21,0.22}	{-0.23,0.28}	0.0093	1.0492	0.1306	1.0411
1,000	75th-90th	{-0.084,0.078}	{-0.11,0.1}	{-0.12,0.12}	0.0046	1.0245	0.0632	1.0198
5,000	75th-90th	{-0.035,0.034}	{-0.045,0.043}	{-0.054,0.05}	0.0020	1.0110	0.0270	1.0089
1	90th-100th	{-2.85,2.86}	{-3.43,5.4}	{-3.98,8.44}	0.9508	2.9164	3.7223	2.4837
2	90th-100th	{-1.99,2.05}	{-2.29,3.63}	{-2.62,5.52}	0.5411	2.3034	2.3300	2.0091
5	90th-100th	{-1.27,1.22}	{-1.43,2.01}	{-1.59,3.03}	0.2742	1.7734	1.2625	1.5923
25	90th-100th	{-0.58,0.53}	{-0.67,0.82}	{-0.76,1.17}	0.0922	1.3133	0.4859	1.2393
50	90th-100th	{-0.4,0.39}	{-0.48,0.55}	{-0.54,0.71}	0.0579	1.2197	0.3179	1.1752
250	90th-100th	{-0.18,0.15}	{-0.22,0.21}	{-0.25,0.26}	0.0246	1.0943	0.1319	1.0771
1,000	90th-100th	{-0.088,0.073}	{-0.11,0.098}	{-0.13,0.12}	0.0114	1.0465	0.0642	1.0376
5,000	90th-100th	{-0.038,0.033}	{-0.047,0.043}	{-0.055,0.057}	0.0043	1.0202	0.0284	1.0173

Eligibility: HCC Using CY2007 Q2-4; 9 Months

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.3%	0.9584
2	12.1%	0.7888
5	12.3%	0.5702
25	12.7%	0.2863
50	12.0%	0.2115
250	13.2%	0.0969
1,000	11.9%	0.0489
5,000	13.3%	0.0220

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.15,1.35}	{-1.56,2.82}	{-2.03,4.6}	0.8103	1.0000	2.0644	0.9996
2	All	{-0.96,1.24}	{-1.23,2.22}	{-1.51,3.34}	0.5724	0.9991	1.4539	0.9968
5	All	{-0.73,0.93}	{-0.88,1.49}	{-1.03,2.12}	0.3614	0.9989	0.9143	0.9961
25	All	{-0.41,0.47}	{-0.49,0.69}	{-0.56,0.95}	0.1614	0.9991	0.4116	0.9974
50	All	{-0.31,0.36}	{-0.37,0.51}	{-0.43,0.66}	0.1141	1.0003	0.2949	1.0026
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.21,0.27}	0.0510	1.0001	0.1316	0.9993
1,000	All	{-0.076,0.081}	{-0.097,0.11}	{-0.12,0.13}	0.0256	1.0000	0.0657	1.0011
5,000	All	{-0.034,0.036}	{-0.044,0.046}	{-0.053,0.055}	0.0117	1.0001	0.0295	1.0000
1	0-75th	{-0.74,1.02}	{-0.86,2.21}	{-0.96,3.66}	0.2665	0.6384	1.4334	0.6804
2	0-75th	{-0.71,1.06}	{-0.82,1.91}	{-0.91,2.85}	0.2440	0.7360	1.1084	0.7641
5	0-75th	{-0.61,0.85}	{-0.71,1.35}	{-0.79,1.89}	0.1928	0.8332	0.7662	0.8479
25	0-75th	{-0.38,0.45}	{-0.45,0.66}	{-0.51,0.9}	0.1036	0.9275	0.3758	0.9328
50	0-75th	{-0.29,0.35}	{-0.35,0.49}	{-0.4,0.64}	0.0766	0.9503	0.2757	0.9577
250	0-75th	{-0.14,0.16}	{-0.18,0.21}	{-0.21,0.26}	0.0360	0.9781	0.1247	0.9790
1,000	0-75th	{-0.074,0.081}	{-0.095,0.11}	{-0.11,0.13}	0.0183	0.9891	0.0632	0.9912
5,000	0-75th	{-0.034,0.037}	{-0.044,0.046}	{-0.052,0.055}	0.0084	0.9951	0.0286	0.9954
1	75th-90th	{-1.44,2.06}	{-1.57,3.71}	{-1.67,5.63}	0.2060	1.5405	2.2941	1.4496
2	75th-90th	{-1.22,1.59}	{-1.33,2.74}	{-1.42,4}	0.1445	1.4520	1.6522	1.3874
5	75th-90th	{-0.92,1.09}	{-1.02,1.75}	{-1.09,2.48}	0.0823	1.3164	1.0118	1.2742
25	75th-90th	{-0.47,0.5}	{-0.56,0.77}	{-0.62,1.04}	0.0316	1.1489	0.4210	1.1256
50	75th-90th	{-0.34,0.38}	{-0.41,0.53}	{-0.46,0.73}	0.0218	1.1072	0.3012	1.1030
250	75th-90th	{-0.16,0.17}	{-0.2,0.23}	{-0.22,0.28}	0.0093	1.0482	0.1285	1.0439
1,000	75th-90th	{-0.077,0.081}	{-0.099,0.11}	{-0.12,0.13}	0.0044	1.0242	0.0627	1.0239
5,000	75th-90th	{-0.036,0.034}	{-0.046,0.043}	{-0.054,0.053}	0.0020	1.0113	0.0272	1.0101
1	90th-100th	{-2.69,3.35}	{-3.21,5.94}	{-3.74,9.15}	0.9663	2.9013	3.9095	2.7186
2	90th-100th	{-1.88,2.25}	{-2.17,3.9}	{-2.48,5.81}	0.5482	2.2914	2.4189	2.1539
5	90th-100th	{-1.21,1.39}	{-1.37,2.21}	{-1.5,3.14}	0.2716	1.7647	1.2875	1.6903
25	90th-100th	{-0.53,0.57}	{-0.63,0.83}	{-0.7,1.13}	0.0919	1.3119	0.4771	1.2898
50	90th-100th	{-0.38,0.38}	{-0.44,0.54}	{-0.5,0.7}	0.0587	1.2150	0.3146	1.1883
250	90th-100th	{-0.18,0.17}	{-0.21,0.23}	{-0.24,0.28}	0.0233	1.0923	0.1366	1.0841
1,000	90th-100th	{-0.084,0.074}	{-0.1,0.1}	{-0.13,0.13}	0.0112	1.0459	0.0647	1.0408
5,000	90th-100th	{-0.036,0.034}	{-0.046,0.045}	{-0.053,0.054}	0.0048	1.0206	0.0279	1.0194

Eligibility: HCC Using CY2007 Q3-4; 6 Months

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.1%	0.9617
2	12.2%	0.7929
5	12.3%	0.5706
25	11.8%	0.2876
50	12.2%	0.2085
250	11.8%	0.0970
1,000	12.5%	0.0485
5,000	13.0%	0.0214

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.13,1.37}	{-1.52,2.83}	{-1.95,4.64}	0.7819	0.9997	2.0494	0.9977
2	All	{-0.95,1.25}	{-1.2,2.24}	{-1.47,3.38}	0.5531	1.0002	1.4628	1.0004
5	All	{-0.72,0.93}	{-0.87,1.49}	{-1.01,2.14}	0.3498	1.0001	0.9150	0.9974
25	All	{-0.41,0.47}	{-0.49,0.69}	{-0.56,0.93}	0.1575	1.0009	0.4118	0.9984
50	All	{-0.31,0.34}	{-0.38,0.49}	{-0.43,0.66}	0.1103	1.0006	0.2910	0.9982
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.22,0.27}	0.0493	1.0005	0.1307	1.0008
1,000	All	{-0.076,0.08}	{-0.097,0.1}	{-0.11,0.12}	0.0249	1.0000	0.0650	0.9997
5,000	All	{-0.034,0.035}	{-0.043,0.045}	{-0.051,0.055}	0.0112	1.0001	0.0289	1.0001
1	0-75th	{-0.75,1.02}	{-0.87,2.21}	{-0.96,3.7}	0.2562	0.6533	1.4478	0.6858
2	0-75th	{-0.71,1.06}	{-0.82,1.9}	{-0.91,2.86}	0.2339	0.7478	1.1177	0.7689
5	0-75th	{-0.62,0.85}	{-0.71,1.35}	{-0.79,1.91}	0.1845	0.8399	0.7653	0.8499
25	0-75th	{-0.38,0.46}	{-0.46,0.66}	{-0.52,0.88}	0.1010	0.9308	0.3771	0.9351
50	0-75th	{-0.29,0.34}	{-0.35,0.48}	{-0.41,0.63}	0.0736	0.9522	0.2709	0.9540
250	0-75th	{-0.14,0.16}	{-0.18,0.21}	{-0.21,0.26}	0.0345	0.9792	0.1245	0.9810
1,000	0-75th	{-0.074,0.08}	{-0.095,0.1}	{-0.11,0.12}	0.0178	0.9894	0.0622	0.9899
5,000	0-75th	{-0.034,0.035}	{-0.043,0.045}	{-0.051,0.055}	0.0081	0.9953	0.0280	0.9957
1	75th-90th	{-1.41,2.06}	{-1.53,3.76}	{-1.63,5.68}	0.1942	1.5132	2.3287	1.4477
2	75th-90th	{-1.2,1.64}	{-1.3,2.81}	{-1.38,4.09}	0.1372	1.4262	1.6752	1.3838
5	75th-90th	{-0.91,1.11}	{-1.01,1.78}	{-1.08,2.5}	0.0805	1.3050	1.0142	1.2727
25	75th-90th	{-0.47,0.51}	{-0.56,0.76}	{-0.62,1.05}	0.0315	1.1477	0.4271	1.1333
50	75th-90th	{-0.34,0.37}	{-0.41,0.55}	{-0.46,0.73}	0.0211	1.1032	0.2943	1.0917
250	75th-90th	{-0.16,0.17}	{-0.2,0.23}	{-0.23,0.27}	0.0091	1.0474	0.1279	1.0444
1,000	75th-90th	{-0.084,0.077}	{-0.1,0.1}	{-0.12,0.13}	0.0047	1.0236	0.0626	1.0207
5,000	75th-90th	{-0.034,0.033}	{-0.044,0.044}	{-0.054,0.052}	0.0019	1.0105	0.0267	1.0097
1	90th-100th	{-2.62,3.31}	{-3.11,5.93}	{-3.61,8.94}	0.9593	2.8305	3.7874	2.6650
2	90th-100th	{-1.83,2.35}	{-2.12,3.97}	{-2.4,5.84}	0.5480	2.2530	2.4180	2.1603
5	90th-100th	{-1.18,1.38}	{-1.33,2.24}	{-1.48,3.18}	0.2682	1.7449	1.2963	1.6909
25	90th-100th	{-0.53,0.54}	{-0.63,0.8}	{-0.7,1.12}	0.0883	1.3063	0.4728	1.2716
50	90th-100th	{-0.38,0.38}	{-0.47,0.55}	{-0.52,0.7}	0.0602	1.2091	0.3196	1.1890
250	90th-100th	{-0.16,0.17}	{-0.2,0.23}	{-0.24,0.28}	0.0225	1.0901	0.1320	1.0839
1,000	90th-100th	{-0.082,0.081}	{-0.1,0.1}	{-0.12,0.12}	0.0108	1.0448	0.0645	1.0418
5,000	90th-100th	{-0.037,0.035}	{-0.044,0.044}	{-0.05,0.054}	0.0049	1.0199	0.0275	1.0191

Eligibility: HCC Using CY2007 Q4; 3 Months

Accuracy Metrics

Group Size	R-Square	MAPE
1	11.6%	0.9725
2	11.3%	0.7996
5	11.4%	0.5757
25	11.0%	0.2908
50	11.4%	0.2115
250	12.2%	0.0977
1,000	11.0%	0.0490
5,000	12.1%	0.0219

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.1,1.39}	{-1.46,2.87}	{-1.85,4.67}	0.7313	1.0000	2.0612	0.9995
2	All	{-0.93,1.27}	{-1.16,2.25}	{-1.4,3.39}	0.5168	0.9997	1.4659	0.9994
5	All	{-0.72,0.95}	{-0.86,1.52}	{-0.99,2.16}	0.3273	0.9992	0.9255	1.0010
25	All	{-0.41,0.49}	{-0.49,0.71}	{-0.55,0.96}	0.1464	1.0008	0.4151	1.0045
50	All	{-0.31,0.36}	{-0.37,0.51}	{-0.42,0.67}	0.1040	1.0005	0.2940	1.0014
250	All	{-0.15,0.16}	{-0.18,0.22}	{-0.22,0.27}	0.0459	0.9998	0.1318	1.0002
1,000	All	{-0.076,0.081}	{-0.095,0.11}	{-0.11,0.13}	0.0230	1.0000	0.0653	1.0011
5,000	All	{-0.035,0.035}	{-0.044,0.045}	{-0.053,0.054}	0.0104	1.0001	0.0292	1.0002
1	0-75th	{-0.77,1.05}	{-0.88,2.25}	{-0.97,3.75}	0.2391	0.6794	1.4899	0.6986
2	0-75th	{-0.73,1.07}	{-0.83,1.93}	{-0.91,2.87}	0.2164	0.7660	1.1402	0.7767
5	0-75th	{-0.62,0.86}	{-0.71,1.37}	{-0.78,1.92}	0.1698	0.8496	0.7817	0.8578
25	0-75th	{-0.38,0.47}	{-0.45,0.67}	{-0.51,0.92}	0.0933	0.9356	0.3821	0.9434
50	0-75th	{-0.3,0.35}	{-0.36,0.5}	{-0.4,0.65}	0.0689	0.9546	0.2750	0.9570
250	0-75th	{-0.15,0.16}	{-0.18,0.21}	{-0.21,0.26}	0.0323	0.9800	0.1255	0.9797
1,000	0-75th	{-0.075,0.082}	{-0.094,0.11}	{-0.11,0.13}	0.0163	0.9901	0.0634	0.9918
5,000	0-75th	{-0.034,0.036}	{-0.044,0.046}	{-0.053,0.055}	0.0076	0.9957	0.0285	0.9961
1	75th-90th	{-1.38,2.03}	{-1.49,3.71}	{-1.57,5.63}	0.1814	1.4689	2.2511	1.4116
2	75th-90th	{-1.17,1.66}	{-1.26,2.81}	{-1.33,4.14}	0.1249	1.3876	1.6842	1.3663
5	75th-90th	{-0.89,1.1}	{-0.99,1.76}	{-1.05,2.51}	0.0759	1.2802	1.0101	1.2592
25	75th-90th	{-0.47,0.52}	{-0.55,0.78}	{-0.61,1.03}	0.0298	1.1364	0.4302	1.1296
50	75th-90th	{-0.34,0.38}	{-0.4,0.54}	{-0.46,0.72}	0.0204	1.0983	0.3006	1.0941
250	75th-90th	{-0.15,0.18}	{-0.19,0.24}	{-0.21,0.29}	0.0083	1.0432	0.1296	1.0475
1,000	75th-90th	{-0.079,0.078}	{-0.098,0.11}	{-0.12,0.13}	0.0042	1.0219	0.0615	1.0220
5,000	75th-90th	{-0.036,0.033}	{-0.045,0.044}	{-0.05,0.051}	0.0018	1.0098	0.0268	1.0093
1	90th-100th	{-2.45,3.36}	{-2.97,6.01}	{-3.47,9.02}	0.9381	2.6999	3.8230	2.6375
2	90th-100th	{-1.75,2.33}	{-2.03,3.92}	{-2.29,5.86}	0.5380	2.1706	2.3776	2.1199
5	90th-100th	{-1.15,1.43}	{-1.3,2.29}	{-1.44,3.25}	0.2635	1.6997	1.3140	1.6881
25	90th-100th	{-0.52,0.61}	{-0.61,0.87}	{-0.69,1.17}	0.0832	1.2859	0.4755	1.2751
50	90th-100th	{-0.36,0.41}	{-0.42,0.57}	{-0.48,0.72}	0.0542	1.1978	0.3111	1.1952
250	90th-100th	{-0.16,0.17}	{-0.2,0.22}	{-0.24,0.28}	0.0206	1.0834	0.1301	1.0833
1,000	90th-100th	{-0.079,0.08}	{-0.099,0.1}	{-0.12,0.13}	0.0100	1.0415	0.0642	1.0396
5,000	90th-100th	{-0.037,0.035}	{-0.047,0.046}	{-0.052,0.057}	0.0046	1.0185	0.0285	1.0174

Turnover: HCC Using CY2007 (10% New Mbrs)

Accuracy Metrics

Group Size	R-Square	MAPE
1	11.0%	0.9687
2	11.1%	0.7994
5	11.0%	0.5788
25	11.8%	0.2889
50	11.1%	0.2096
250	10.6%	0.0978
1,000	11.7%	0.0488
5,000	10.7%	0.0221

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.12,1.36}	{-1.53,2.84}	{-2.01,4.65}	0.7877	1.0013	2.0622	0.9972
2	All	{-0.95,1.27}	{-1.21,2.26}	{-1.49,3.41}	0.5560	0.9985	1.4702	1.0019
5	All	{-0.73,0.95}	{-0.88,1.51}	{-1.03,2.17}	0.3533	1.0005	0.9322	1.0044
25	All	{-0.41,0.48}	{-0.49,0.71}	{-0.56,0.95}	0.1577	1.0011	0.4119	1.0019
50	All	{-0.31,0.35}	{-0.37,0.5}	{-0.43,0.66}	0.1109	0.9993	0.2892	1.0007
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.22,0.27}	0.0501	0.9996	0.1304	1.0013
1,000	All	{-0.076,0.08}	{-0.096,0.1}	{-0.11,0.13}	0.0250	1.0002	0.0652	1.0001
5,000	All	{-0.035,0.036}	{-0.044,0.046}	{-0.053,0.055}	0.0111	1.0000	0.0292	1.0001
1	0-75th	{-0.78,1.05}	{-0.9,2.26}	{-0.99,3.78}	0.2757	0.6586	1.4886	0.7005
2	0-75th	{-0.72,1.09}	{-0.82,1.96}	{-0.9,2.92}	0.2365	0.7451	1.1474	0.7796
5	0-75th	{-0.61,0.88}	{-0.71,1.39}	{-0.78,1.96}	0.1868	0.8391	0.7864	0.8623
25	0-75th	{-0.38,0.46}	{-0.45,0.68}	{-0.51,0.9}	0.1009	0.9310	0.3776	0.9384
50	0-75th	{-0.29,0.34}	{-0.35,0.49}	{-0.4,0.64}	0.0744	0.9507	0.2698	0.9573
250	0-75th	{-0.15,0.16}	{-0.18,0.22}	{-0.21,0.26}	0.0354	0.9781	0.1253	0.9836
1,000	0-75th	{-0.074,0.08}	{-0.095,0.1}	{-0.11,0.13}	0.0180	0.9895	0.0627	0.9906
5,000	0-75th	{-0.035,0.036}	{-0.044,0.048}	{-0.052,0.056}	0.0080	0.9953	0.0285	0.9960
1	75th-90th	{-1.39,1.97}	{-1.52,3.68}	{-1.62,5.64}	0.2077	1.4803	2.2521	1.3963
2	75th-90th	{-1.21,1.6}	{-1.31,2.73}	{-1.39,3.98}	0.1411	1.4263	1.6409	1.3642
5	75th-90th	{-0.92,1.1}	{-1.01,1.74}	{-1.08,2.52}	0.0807	1.3063	1.0365	1.2653
25	75th-90th	{-0.46,0.51}	{-0.55,0.78}	{-0.61,1.03}	0.0316	1.1477	0.4240	1.1356
50	75th-90th	{-0.34,0.36}	{-0.4,0.53}	{-0.45,0.7}	0.0209	1.1034	0.2908	1.0964
250	75th-90th	{-0.16,0.16}	{-0.2,0.21}	{-0.23,0.27}	0.0091	1.0468	0.1253	1.0370
1,000	75th-90th	{-0.081,0.08}	{-0.1,0.11}	{-0.12,0.13}	0.0045	1.0237	0.0633	1.0211
5,000	75th-90th	{-0.035,0.034}	{-0.044,0.044}	{-0.053,0.052}	0.0019	1.0104	0.0270	1.0084
1	90th-100th	{-2.67,3.16}	{-3.2,5.74}	{-3.76,8.94}	0.9596	2.8519	3.8415	2.6221
2	90th-100th	{-1.86,2.3}	{-2.15,3.93}	{-2.46,5.87}	0.5488	2.2575	2.4228	2.1263
5	90th-100th	{-1.21,1.36}	{-1.37,2.18}	{-1.51,3.17}	0.2757	1.7524	1.3163	1.6788
25	90th-100th	{-0.55,0.56}	{-0.64,0.88}	{-0.7,1.13}	0.0902	1.3072	0.4737	1.2778
50	90th-100th	{-0.39,0.4}	{-0.45,0.57}	{-0.52,0.7}	0.0569	1.2080	0.3199	1.1832
250	90th-100th	{-0.17,0.16}	{-0.21,0.22}	{-0.25,0.28}	0.0224	1.0904	0.1344	1.0807
1,000	90th-100th	{-0.085,0.08}	{-0.11,0.1}	{-0.13,0.12}	0.0104	1.0448	0.0638	1.0395
5,000	90th-100th	{-0.039,0.034}	{-0.049,0.043}	{-0.057,0.052}	0.0049	1.0198	0.0287	1.0176

Turnover: HCC Using CY2007 (30% New Mbrs)

Accuracy Metrics

Group Size	R-Square	MAPE
1	9.0%	0.9940
2	8.7%	0.8144
5	8.8%	0.5891
25	8.3%	0.2935
50	8.5%	0.2149
250	9.4%	0.0989
1,000	9.2%	0.0499
5,000	9.5%	0.0223

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.07,1.43}	{-1.37,2.95}	{-1.82,4.79}	0.6981	0.9996	2.0719	1.0023
2	All	{-0.93,1.29}	{-1.15,2.3}	{-1.42,3.45}	0.4956	1.0009	1.4556	0.9984
5	All	{-0.73,0.97}	{-0.87,1.56}	{-1,2.22}	0.3121	0.9986	0.9270	1.0006
25	All	{-0.42,0.48}	{-0.5,0.72}	{-0.56,0.98}	0.1396	1.0006	0.4084	0.9963
50	All	{-0.32,0.36}	{-0.38,0.51}	{-0.43,0.67}	0.0980	1.0001	0.2923	0.9983
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.22,0.27}	0.0441	1.0000	0.1311	0.9999
1,000	All	{-0.079,0.08}	{-0.1,0.1}	{-0.12,0.13}	0.0219	0.9998	0.0654	0.9989
5,000	All	{-0.035,0.036}	{-0.045,0.047}	{-0.053,0.056}	0.0099	0.9999	0.0292	0.9995
1	0-75th	{-0.84,1.14}	{-0.94,2.44}	{-1.01,4.06}	0.2721	0.7157	1.6377	0.7507
2	0-75th	{-0.75,1.15}	{-0.84,2.05}	{-0.91,3.07}	0.2094	0.7823	1.2166	0.8097
5	0-75th	{-0.63,0.91}	{-0.72,1.45}	{-0.79,2.03}	0.1596	0.8562	0.8086	0.8759
25	0-75th	{-0.39,0.48}	{-0.47,0.7}	{-0.53,0.94}	0.0883	0.9383	0.3818	0.9425
50	0-75th	{-0.3,0.35}	{-0.36,0.5}	{-0.42,0.66}	0.0648	0.9569	0.2778	0.9610
250	0-75th	{-0.15,0.16}	{-0.18,0.22}	{-0.21,0.26}	0.0308	0.9809	0.1253	0.9823
1,000	0-75th	{-0.078,0.079}	{-0.098,0.1}	{-0.11,0.13}	0.0155	0.9904	0.0633	0.9900
5,000	0-75th	{-0.035,0.036}	{-0.044,0.047}	{-0.053,0.056}	0.0072	0.9957	0.0284	0.9956
1	75th-90th	{-1.22,1.94}	{-1.33,3.6}	{-1.42,5.42}	0.1582	1.3181	2.1423	1.2865
2	75th-90th	{-1.14,1.54}	{-1.23,2.61}	{-1.31,3.82}	0.1284	1.3368	1.5512	1.2783
5	75th-90th	{-0.9,1.07}	{-0.99,1.72}	{-1.06,2.48}	0.0745	1.2618	1.0072	1.2221
25	75th-90th	{-0.46,0.5}	{-0.54,0.76}	{-0.61,1.03}	0.0278	1.1301	0.4196	1.1087
50	75th-90th	{-0.34,0.37}	{-0.42,0.52}	{-0.46,0.69}	0.0193	1.0923	0.2943	1.0783
250	75th-90th	{-0.16,0.16}	{-0.2,0.23}	{-0.23,0.29}	0.0083	1.0420	0.1317	1.0387
1,000	75th-90th	{-0.082,0.079}	{-0.1,0.11}	{-0.12,0.13}	0.0040	1.0206	0.0642	1.0197
5,000	75th-90th	{-0.037,0.036}	{-0.046,0.048}	{-0.057,0.055}	0.0018	1.0093	0.0283	1.0079
1	90th-100th	{-2.49,2.99}	{-2.99,5.47}	{-3.53,8.24}	0.9547	2.6155	3.6296	2.4311
2	90th-100th	{-1.78,2.19}	{-2.06,3.65}	{-2.37,5.34}	0.5348	2.1361	2.2585	1.9933
5	90th-100th	{-1.17,1.37}	{-1.31,2.21}	{-1.44,3.2}	0.2549	1.6722	1.2701	1.6039
25	90th-100th	{-0.54,0.54}	{-0.63,0.84}	{-0.7,1.11}	0.0815	1.2733	0.4639	1.2308
50	90th-100th	{-0.38,0.39}	{-0.45,0.55}	{-0.51,0.69}	0.0512	1.1862	0.3162	1.1586
250	90th-100th	{-0.17,0.17}	{-0.21,0.23}	{-0.24,0.28}	0.0201	1.0804	0.1348	1.0734
1,000	90th-100th	{-0.085,0.083}	{-0.11,0.1}	{-0.12,0.12}	0.0097	1.0392	0.0642	1.0340
5,000	90th-100th	{-0.036,0.035}	{-0.045,0.047}	{-0.054,0.056}	0.0041	1.0174	0.0280	1.0161

Data Quality: HCC Using CY2007 (Ignore Inpatient Dx)

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.35%	0.9560
2	12.2%	0.7912
5	12.4%	0.5719
25	12.3%	0.2875
50	12.8%	0.2090
250	12.3%	0.0962
1,000	12.7%	0.0488
5,000	11.6%	0.0217

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.16,1.35}	{-1.6,2.8}	{-2.08,4.6}	0.8242	0.9998	2.0560	0.9995
2	All	{-0.96,1.25}	{-1.24,2.23}	{-1.53,3.37}	0.5817	0.9999	1.4760	1.0029
5	All	{-0.73,0.94}	{-0.89,1.5}	{-1.04,2.12}	0.3690	1.0003	0.9206	1.0002
25	All	{-0.41,0.48}	{-0.49,0.7}	{-0.56,0.94}	0.1650	1.0001	0.4123	1.0022
50	All	{-0.31,0.35}	{-0.38,0.49}	{-0.43,0.66}	0.1166	1.0005	0.2917	0.9994
250	All	{-0.15,0.16}	{-0.18,0.21}	{-0.21,0.27}	0.0523	1.0001	0.1299	1.0011
1,000	All	{-0.077,0.08}	{-0.096,0.1}	{-0.11,0.13}	0.0262	0.9997	0.0657	0.9993
5,000	All	{-0.034,0.036}	{-0.043,0.046}	{-0.051,0.054}	0.0114	0.9999	0.0289	1.0006
1	0-75th	{-0.73,1.01}	{-0.86,2.17}	{-0.96,3.61}	0.2736	0.6281	1.4299	0.6754
2	0-75th	{-0.71,1.06}	{-0.83,1.9}	{-0.92,2.83}	0.2521	0.7317	1.1115	0.7644
5	0-75th	{-0.61,0.86}	{-0.71,1.36}	{-0.79,1.9}	0.1989	0.8316	0.7666	0.8506
25	0-75th	{-0.38,0.47}	{-0.45,0.67}	{-0.51,0.89}	0.1062	0.9266	0.3758	0.9366
50	0-75th	{-0.29,0.34}	{-0.36,0.48}	{-0.41,0.63}	0.0780	0.9495	0.2702	0.9532
250	0-75th	{-0.14,0.16}	{-0.18,0.21}	{-0.21,0.26}	0.0372	0.9776	0.1237	0.9808
1,000	0-75th	{-0.075,0.08}	{-0.095,0.1}	{-0.11,0.13}	0.0189	0.9886	0.0631	0.9892
5,000	0-75th	{-0.033,0.037}	{-0.043,0.047}	{-0.051,0.055}	0.0083	0.9951	0.0283	0.9963
1	75th-90th	{-1.46,2.08}	{-1.6,3.81}	{-1.7,5.78}	0.2154	1.5606	2.3194	1.4745
2	75th-90th	{-1.24,1.68}	{-1.35,2.84}	{-1.43,4.14}	0.1463	1.4686	1.6988	1.4159
5	75th-90th	{-0.93,1.13}	{-1.02,1.78}	{-1.1,2.53}	0.0829	1.3242	1.0241	1.2853
25	75th-90th	{-0.47,0.53}	{-0.55,0.78}	{-0.62,1.05}	0.0330	1.1549	0.4253	1.1424
50	75th-90th	{-0.35,0.36}	{-0.4,0.51}	{-0.46,0.71}	0.0218	1.1093	0.2934	1.0958
250	75th-90th	{-0.15,0.16}	{-0.19,0.21}	{-0.22,0.27}	0.0094	1.0496	0.1246	1.0462
1,000	75th-90th	{-0.081,0.081}	{-0.098,0.11}	{-0.12,0.14}	0.0046	1.0244	0.0636	1.0225
5,000	75th-90th	{-0.034,0.035}	{-0.043,0.046}	{-0.05,0.056}	0.0020	1.0109	0.0270	1.0110
1	90th-100th	{-2.75,3.3}	{-3.26,6.01}	{-3.78,9.17}	0.9446	2.9399	3.8457	2.7121
2	90th-100th	{-1.91,2.29}	{-2.2,3.95}	{-2.49,5.9}	0.5431	2.3081	2.4782	2.1725
5	90th-100th	{-1.23,1.38}	{-1.37,2.2}	{-1.52,3.14}	0.2760	1.7799	1.3129	1.6938
25	90th-100th	{-0.53,0.57}	{-0.63,0.86}	{-0.69,1.15}	0.0902	1.3185	0.4782	1.2835
50	90th-100th	{-0.37,0.39}	{-0.45,0.57}	{-0.51,0.74}	0.0625	1.2204	0.3217	1.2016
250	90th-100th	{-0.17,0.16}	{-0.21,0.23}	{-0.24,0.28}	0.0219	1.0944	0.1327	1.0857
1,000	90th-100th	{-0.082,0.074}	{-0.1,0.1}	{-0.12,0.12}	0.0113	1.0463	0.0636	1.0397
5,000	90th-100th	{-0.037,0.03}	{-0.045,0.039}	{-0.053,0.048}	0.0047	1.0201	0.0263	1.0171

Data Quality: HCC Using CY2007 (Ignore Outpatient Dx)

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.3%	0.9579
2	12.2%	0.7891
5	12.6%	0.5706
25	11.8%	0.2888
50	12.7%	0.2111
250	12.0%	0.0970
1,000	12.0%	0.0483
5,000	12.5%	0.0216

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.16,1.33}	{-1.6,2.81}	{-2.09,4.59}	0.8288	1.0004	2.0776	0.9991
2	All	{-0.96,1.25}	{-1.24,2.22}	{-1.54,3.35}	0.5855	0.9994	1.4627	0.9999
5	All	{-0.73,0.93}	{-0.89,1.49}	{-1.04,2.13}	0.3718	1.0013	0.9232	1.0015
25	All	{-0.41,0.48}	{-0.5,0.71}	{-0.56,0.95}	0.1654	1.0002	0.4128	1.0017
50	All	{-0.31,0.35}	{-0.38,0.5}	{-0.43,0.66}	0.1177	0.9993	0.2952	0.9995
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.21,0.27}	0.0523	0.9996	0.1307	0.9986
1,000	All	{-0.077,0.078}	{-0.096,0.1}	{-0.11,0.13}	0.0261	1.0001	0.0650	0.9998
5,000	All	{-0.034,0.035}	{-0.044,0.045}	{-0.053,0.053}	0.0117	1.0000	0.0290	1.0000
1	0-75th	{-0.73,1.01}	{-0.86,2.19}	{-0.96,3.63}	0.2719	0.6289	1.4289	0.6766
2	0-75th	{-0.7,1.06}	{-0.82,1.9}	{-0.91,2.84}	0.2497	0.7300	1.1015	0.7626
5	0-75th	{-0.61,0.85}	{-0.71,1.34}	{-0.79,1.9}	0.1983	0.8310	0.7709	0.8506
25	0-75th	{-0.38,0.47}	{-0.45,0.67}	{-0.52,0.89}	0.1069	0.9267	0.3767	0.9372
50	0-75th	{-0.29,0.35}	{-0.36,0.49}	{-0.4,0.65}	0.0789	0.9478	0.2760	0.9546
250	0-75th	{-0.15,0.16}	{-0.18,0.22}	{-0.21,0.26}	0.0368	0.9771	0.1251	0.9794
1,000	0-75th	{-0.075,0.079}	{-0.094,0.1}	{-0.11,0.13}	0.0186	0.9889	0.0625	0.9898
5,000	0-75th	{-0.034,0.035}	{-0.044,0.046}	{-0.053,0.054}	0.0085	0.9950	0.0280	0.9954
1	75th-90th	{-1.46,2.06}	{-1.6,3.79}	{-1.7,5.74}	0.2143	1.5569	2.3405	1.4688
2	75th-90th	{-1.23,1.65}	{-1.35,2.78}	{-1.44,4.13}	0.1479	1.4646	1.6868	1.4096
5	75th-90th	{-0.93,1.12}	{-1.03,1.76}	{-1.1,2.5}	0.0842	1.3274	1.0102	1.2831
25	75th-90th	{-0.47,0.54}	{-0.55,0.8}	{-0.62,1.11}	0.0333	1.1549	0.4376	1.1426
50	75th-90th	{-0.35,0.35}	{-0.42,0.53}	{-0.47,0.7}	0.0222	1.1086	0.2991	1.0945
250	75th-90th	{-0.17,0.15}	{-0.2,0.21}	{-0.23,0.27}	0.0096	1.0487	0.1249	1.0372
1,000	75th-90th	{-0.08,0.077}	{-0.098,0.1}	{-0.12,0.13}	0.0048	1.0248	0.0618	1.0231
5,000	75th-90th	{-0.034,0.034}	{-0.044,0.043}	{-0.053,0.052}	0.0021	1.0111	0.0267	1.0104
1	90th-100th	{-2.77,3.29}	{-3.28,5.93}	{-3.82,9.2}	0.9663	2.9541	3.9490	2.7159
2	90th-100th	{-1.92,2.28}	{-2.22,3.9}	{-2.54,5.98}	0.5589	2.3213	2.4487	2.1655
5	90th-100th	{-1.23,1.39}	{-1.39,2.21}	{-1.55,3.31}	0.2816	1.7887	1.3195	1.7103
25	90th-100th	{-0.55,0.52}	{-0.63,0.82}	{-0.71,1.15}	0.0903	1.3192	0.4662	1.2739
50	90th-100th	{-0.38,0.37}	{-0.46,0.55}	{-0.51,0.73}	0.0628	1.2213	0.3153	1.1944
250	90th-100th	{-0.17,0.16}	{-0.21,0.21}	{-0.24,0.27}	0.0237	1.0948	0.1320	1.0854
1,000	90th-100th	{-0.087,0.076}	{-0.11,0.11}	{-0.12,0.13}	0.0112	1.0471	0.0637	1.0395
5,000	90th-100th	{-0.037,0.033}	{-0.047,0.041}	{-0.057,0.053}	0.0050	1.0207	0.0281	1.0188

Data Quality: HCC Using CY2007 (Ignore Professional Dx)

Accuracy Metrics

Group Size	R-Square	MAPE
1	9.0%	0.9907
2	9.6%	0.8155
5	9.4%	0.5854
25	9.3%	0.2914
50	9.9%	0.2125
250	8.8%	0.0983
1,000	8.9%	0.0496
5,000	9.2%	0.0222

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.09,1.4}	{-1.43,2.92}	{-1.81,4.75}	0.6672	0.9991	2.0809	0.9966
2	All	{-0.92,1.31}	{-1.14,2.32}	{-1.38,3.49}	0.4747	1.0001	1.4705	1.0038
5	All	{-0.72,0.96}	{-0.86,1.55}	{-0.98,2.2}	0.2981	0.9997	0.9230	1.0002
25	All	{-0.41,0.49}	{-0.49,0.71}	{-0.55,0.95}	0.1327	0.9996	0.4094	1.0015
50	All	{-0.31,0.35}	{-0.38,0.5}	{-0.43,0.66}	0.0944	1.0002	0.2900	0.9974
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.22,0.27}	0.0421	1.0000	0.1297	0.9983
1,000	All	{-0.079,0.081}	{-0.098,0.1}	{-0.12,0.13}	0.0213	1.0002	0.0651	0.9998
5,000	All	{-0.036,0.036}	{-0.045,0.046}	{-0.052,0.056}	0.0094	1.0000	0.0291	0.9995
1	0-75th	{-0.78,1.07}	{-0.89,2.31}	{-0.96,3.85}	0.2187	0.7038	1.5376	0.7161
2	0-75th	{-0.74,1.11}	{-0.84,2}	{-0.91,2.99}	0.1971	0.7859	1.1646	0.7967
5	0-75th	{-0.64,0.88}	{-0.72,1.41}	{-0.79,1.97}	0.1547	0.8630	0.7933	0.8696
25	0-75th	{-0.39,0.47}	{-0.46,0.69}	{-0.52,0.91}	0.0850	0.9406	0.3812	0.9470
50	0-75th	{-0.31,0.34}	{-0.37,0.49}	{-0.42,0.64}	0.0631	0.9587	0.2732	0.9561
250	0-75th	{-0.15,0.16}	{-0.18,0.22}	{-0.21,0.27}	0.0296	0.9819	0.1256	0.9813
1,000	0-75th	{-0.076,0.081}	{-0.096,0.1}	{-0.11,0.13}	0.0151	0.9911	0.0633	0.9919
5,000	0-75th	{-0.036,0.036}	{-0.045,0.047}	{-0.052,0.056}	0.0068	0.9959	0.0284	0.9957
1	75th-90th	{-1.32,2.09}	{-1.43,3.77}	{-1.51,5.79}	0.1694	1.4021	2.3544	1.3863
2	75th-90th	{-1.16,1.69}	{-1.24,2.86}	{-1.31,4.24}	0.1145	1.3532	1.6926	1.3511
5	75th-90th	{-0.89,1.15}	{-0.98,1.82}	{-1.05,2.63}	0.0699	1.2560	1.0438	1.2524
25	75th-90th	{-0.47,0.51}	{-0.55,0.75}	{-0.61,0.99}	0.0265	1.1230	0.4243	1.1074
50	75th-90th	{-0.33,0.38}	{-0.4,0.54}	{-0.46,0.7}	0.0182	1.0893	0.2918	1.0901
250	75th-90th	{-0.16,0.16}	{-0.19,0.21}	{-0.22,0.26}	0.0076	1.0398	0.1242	1.0357
1,000	75th-90th	{-0.085,0.078}	{-0.1,0.1}	{-0.12,0.12}	0.0038	1.0203	0.0634	1.0156
5,000	75th-90th	{-0.036,0.036}	{-0.045,0.045}	{-0.052,0.056}	0.0016	1.0088	0.0280	1.0081
1	90th-100th	{-2.39,3.22}	{-2.89,5.73}	{-3.45,8.81}	0.8569	2.5517	3.7443	2.4617
2	90th-100th	{-1.71,2.33}	{-1.98,3.89}	{-2.24,5.81}	0.4963	2.0787	2.3633	2.0375
5	90th-100th	{-1.13,1.4}	{-1.26,2.2}	{-1.38,3.12}	0.2331	1.6390	1.2570	1.6004
25	90th-100th	{-0.51,0.56}	{-0.59,0.86}	{-0.66,1.16}	0.0748	1.2571	0.4634	1.2514
50	90th-100th	{-0.37,0.38}	{-0.43,0.55}	{-0.49,0.74}	0.0484	1.1777	0.3141	1.1679
250	90th-100th	{-0.17,0.16}	{-0.21,0.23}	{-0.24,0.27}	0.0199	1.0763	0.1321	1.0693
1,000	90th-100th	{-0.084,0.082}	{-0.1,0.11}	{-0.12,0.13}	0.0094	1.0385	0.0650	1.0358
5,000	90th-100th	{-0.036,0.036}	{-0.044,0.045}	{-0.052,0.057}	0.0043	1.0167	0.0282	1.0151

Baseline: Age/Gender Slope using CY2007 Allowed Cost

Accuracy Metrics

Group Size	R-Square	MAPE
1	0.5%	1.0817
2	0.5%	0.8764
5	0.5%	0.6232
25	0.4%	0.3095
50	0.5%	0.2240
250	0.6%	0.1034
1,000	0.5%	0.0517
5,000	0.5%	0.0232

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.02,1.59}	{-1.09,3.23}	{-1.13,5.17}	0.1468	1.0002	2.0770	0.9999
2	All	{-0.9,1.42}	{-0.97,2.48}	{-1.02,3.73}	0.1038	1.0000	1.4570	1.0000
5	All	{-0.75,1.02}	{-0.82,1.65}	{-0.87,2.35}	0.0657	1.0001	0.9284	0.9997
25	All	{-0.44,0.51}	{-0.51,0.76}	{-0.57,1.02}	0.0292	0.9999	0.4136	1.0022
50	All	{-0.33,0.37}	{-0.39,0.53}	{-0.45,0.69}	0.0207	0.9999	0.2908	0.9976
250	All	{-0.16,0.17}	{-0.2,0.23}	{-0.23,0.28}	0.0093	1.0001	0.1311	0.9998
1,000	All	{-0.081,0.084}	{-0.1,0.11}	{-0.12,0.14}	0.0046	1.0000	0.0651	1.0000
5,000	All	{-0.037,0.038}	{-0.047,0.048}	{-0.056,0.059}	0.0021	1.0000	0.0291	1.0002
1	0-75th	{-0.93,1.45}	{-0.99,3.09}	{-1.03,5.07}	0.1067	0.9274	2.0389	0.9250
2	0-75th	{-0.86,1.38}	{-0.92,2.44}	{-0.95,3.68}	0.0749	0.9545	1.4364	0.9559
5	0-75th	{-0.74,1.01}	{-0.8,1.64}	{-0.85,2.34}	0.0479	0.9721	0.9233	0.9734
25	0-75th	{-0.43,0.51}	{-0.51,0.77}	{-0.57,1.03}	0.0212	0.9875	0.4120	0.9906
50	0-75th	{-0.33,0.38}	{-0.39,0.54}	{-0.44,0.69}	0.0152	0.9911	0.2898	0.9894
250	0-75th	{-0.16,0.17}	{-0.2,0.23}	{-0.23,0.28}	0.0068	0.9961	0.1302	0.9958
1,000	0-75th	{-0.081,0.084}	{-0.1,0.11}	{-0.12,0.14}	0.0034	0.9980	0.0652	0.9984
5,000	0-75th	{-0.036,0.038}	{-0.047,0.048}	{-0.056,0.058}	0.0015	0.9991	0.0290	0.9993
1	75th-90th	{-1.09,1.85}	{-1.12,3.33}	{-1.14,5.01}	0.0144	1.1456	2.0519	1.1408
2	75th-90th	{-0.98,1.51}	{-1.03,2.56}	{-1.06,3.81}	0.0200	1.1059	1.4998	1.0988
5	75th-90th	{-0.8,1.05}	{-0.87,1.67}	{-0.91,2.35}	0.0115	1.0638	0.9286	1.0581
25	75th-90th	{-0.45,0.52}	{-0.52,0.75}	{-0.59,1.02}	0.0051	1.0276	0.4182	1.0272
50	75th-90th	{-0.34,0.36}	{-0.4,0.52}	{-0.45,0.69}	0.0036	1.0196	0.2926	1.0172
250	75th-90th	{-0.16,0.18}	{-0.2,0.24}	{-0.23,0.29}	0.0016	1.0088	0.1329	1.0091
1,000	75th-90th	{-0.083,0.084}	{-0.1,0.11}	{-0.12,0.13}	0.0008	1.0044	0.0643	1.0033
5,000	75th-90th	{-0.037,0.038}	{-0.047,0.05}	{-0.055,0.059}	0.0004	1.0020	0.0294	1.0020
1	90th-100th	{-1.17,1.98}	{-1.21,3.84}	{-1.24,5.9}	0.0490	1.2203	2.2969	1.2390
2	90th-100th	{-1.04,1.6}	{-1.09,2.66}	{-1.13,3.87}	0.0321	1.1771	1.5211	1.1780
5	90th-100th	{-0.82,1.06}	{-0.9,1.73}	{-0.95,2.43}	0.0245	1.1150	0.9543	1.1092
25	90th-100th	{-0.45,0.52}	{-0.52,0.78}	{-0.57,1.01}	0.0124	1.0516	0.4133	1.0515
50	90th-100th	{-0.34,0.38}	{-0.4,0.52}	{-0.45,0.67}	0.0084	1.0363	0.2925	1.0291
250	90th-100th	{-0.16,0.18}	{-0.2,0.24}	{-0.23,0.28}	0.0039	1.0164	0.1337	1.0156
1,000	90th-100th	{-0.082,0.083}	{-0.1,0.11}	{-0.12,0.13}	0.0019	1.0081	0.0649	1.0074
5,000	90th-100th	{-0.037,0.038}	{-0.049,0.05}	{-0.059,0.058}	0.0009	1.0037	0.0291	1.0034

Standard Model: HCC Using CY2007 Claims

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.4%	0.9553
2	12.5%	0.7896
5	12.8%	0.5746
25	14.8%	0.2876
50	18.1%	0.2110
250	22.4%	0.0964
1,000	29.0%	0.0487
5,000	44.0%	0.0219

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.16,1.35}	{-1.59,2.81}	{-2.08,4.61}	0.8276	0.9993	2.0554	0.9990
2	All	{-0.97,1.24}	{-1.25,2.22}	{-1.54,3.37}	0.5902	1.0017	1.4681	1.0011
5	All	{-0.73,0.94}	{-0.89,1.51}	{-1.05,2.15}	0.3796	0.9991	0.9337	1.0020
25	All	{-0.41,0.48}	{-0.49,0.7}	{-0.57,0.94}	0.1854	0.9986	0.4184	0.9989
50	All	{-0.31,0.35}	{-0.37,0.51}	{-0.43,0.67}	0.1488	0.9990	0.3063	0.9998
250	All	{-0.15,0.16}	{-0.18,0.21}	{-0.22,0.27}	0.0731	0.9996	0.1385	1.0001
1,000	All	{-0.077,0.079}	{-0.097,0.1}	{-0.11,0.13}	0.0449	0.9996	0.0728	0.9994
5,000	All	{-0.035,0.036}	{-0.044,0.046}	{-0.053,0.053}	0.0286	0.9999	0.0367	1.0000
1	0-75th	{-0.73,1.02}	{-0.86,2.2}	{-0.96,3.65}	0.2744	0.6282	1.4307	0.6784
2	0-75th	{-0.71,1.06}	{-0.82,1.89}	{-0.92,2.84}	0.2535	0.7301	1.1087	0.7625
5	0-75th	{-0.61,0.86}	{-0.71,1.35}	{-0.79,1.91}	0.2015	0.8273	0.7697	0.8487
25	0-75th	{-0.38,0.47}	{-0.45,0.69}	{-0.51,0.91}	0.1148	0.9220	0.3797	0.9331
50	0-75th	{-0.29,0.35}	{-0.35,0.49}	{-0.4,0.65}	0.0894	0.9442	0.2760	0.9505
250	0-75th	{-0.14,0.16}	{-0.18,0.21}	{-0.21,0.26}	0.0445	0.9740	0.1257	0.9772
1,000	0-75th	{-0.074,0.079}	{-0.094,0.1}	{-0.11,0.13}	0.0267	0.9852	0.0646	0.9865
5,000	0-75th	{-0.033,0.036}	{-0.043,0.046}	{-0.051,0.054}	0.0156	0.9917	0.0302	0.9928
1	75th-90th	{-1.46,2.05}	{-1.59,3.76}	{-1.69,5.7}	0.2136	1.5590	2.2948	1.4614
2	75th-90th	{-1.24,1.61}	{-1.35,2.77}	{-1.44,4.06}	0.1482	1.4740	1.6519	1.4021
5	75th-90th	{-0.93,1.13}	{-1.03,1.8}	{-1.1,2.58}	0.0841	1.3286	1.0245	1.2911
25	75th-90th	{-0.48,0.51}	{-0.56,0.76}	{-0.62,1}	0.0335	1.1546	0.4244	1.1320
50	75th-90th	{-0.34,0.39}	{-0.41,0.56}	{-0.46,0.73}	0.0226	1.1087	0.3064	1.1035
250	75th-90th	{-0.16,0.17}	{-0.2,0.21}	{-0.23,0.27}	0.0101	1.0496	0.1264	1.0462
1,000	75th-90th	{-0.081,0.078}	{-0.1,0.11}	{-0.12,0.13}	0.0050	1.0253	0.0631	1.0224
5,000	75th-90th	{-0.036,0.034}	{-0.045,0.045}	{-0.055,0.052}	0.0023	1.0118	0.0272	1.0110
1	90th-100th	{-2.75,3.32}	{-3.27,6}	{-3.82,9.1}	0.9608	2.9460	3.8698	2.7116
2	90th-100th	{-1.93,2.33}	{-2.22,3.95}	{-2.55,5.91}	0.5605	2.3301	2.4815	2.1888
5	90th-100th	{-1.23,1.39}	{-1.39,2.3}	{-1.53,3.39}	0.3324	1.7934	1.3730	1.7184
25	90th-100th	{-0.57,0.54}	{-0.66,0.82}	{-0.73,1.09}	0.2160	1.3396	0.5040	1.2927
50	90th-100th	{-0.38,0.4}	{-0.46,0.56}	{-0.52,0.76}	0.2435	1.2456	0.3821	1.2134
250	90th-100th	{-0.17,0.16}	{-0.21,0.22}	{-0.25,0.28}	0.1266	1.1168	0.1777	1.1029
1,000	90th-100th	{-0.088,0.078}	{-0.11,0.11}	{-0.13,0.13}	0.0857	1.0692	0.0995	1.0615
5,000	90th-100th	{-0.045,0.033}	{-0.055,0.044}	{-0.063,0.051}	0.0605	1.0441	0.0596	1.0378

Lag: HCC Using CY2006-7 Less CY07 Q4

Accuracy Metrics

Group Size	R-Square	MAPE
1	10.1%	0.9710
2	10.2%	0.8023
5	10.6%	0.5786
25	12.8%	0.2925
50	15.1%	0.2142
250	21.0%	0.0981
1,000	22.8%	0.0488
5,000	36.8%	0.0225

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.18,1.36}	{-1.63,2.83}	{-2.13,4.66}	0.8266	1.0021	2.0690	1.0002
2	All	{-0.98,1.26}	{-1.28,2.26}	{-1.57,3.41}	0.5834	1.0009	1.4631	1.0015
5	All	{-0.74,0.95}	{-0.91,1.52}	{-1.06,2.14}	0.3790	0.9997	0.9157	0.9990
25	All	{-0.42,0.49}	{-0.5,0.71}	{-0.57,0.96}	0.1898	1.0012	0.4208	1.0006
50	All	{-0.31,0.36}	{-0.38,0.52}	{-0.44,0.67}	0.1413	0.9986	0.3031	1.0006
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.22,0.27}	0.0799	1.0007	0.1397	1.0005
1,000	All	{-0.077,0.08}	{-0.097,0.1}	{-0.12,0.13}	0.0419	0.9993	0.0702	0.9991
5,000	All	{-0.036,0.037}	{-0.046,0.047}	{-0.054,0.057}	0.0275	0.9996	0.0356	0.9997
1	0-75th	{-0.73,1.07}	{-0.86,2.28}	{-0.96,3.8}	0.2733	0.6318	1.5064	0.6997
2	0-75th	{-0.71,1.11}	{-0.83,1.99}	{-0.92,2.96}	0.2514	0.7321	1.1475	0.7825
5	0-75th	{-0.61,0.9}	{-0.71,1.41}	{-0.79,1.96}	0.1995	0.8289	0.7774	0.8613
25	0-75th	{-0.38,0.48}	{-0.45,0.7}	{-0.51,0.94}	0.1125	0.9248	0.3838	0.9388
50	0-75th	{-0.29,0.35}	{-0.36,0.5}	{-0.41,0.65}	0.0884	0.9451	0.2774	0.9554
250	0-75th	{-0.14,0.16}	{-0.18,0.22}	{-0.21,0.27}	0.0450	0.9745	0.1272	0.9790
1,000	0-75th	{-0.074,0.081}	{-0.093,0.11}	{-0.11,0.13}	0.0266	0.9853	0.0645	0.9878
5,000	0-75th	{-0.033,0.038}	{-0.044,0.049}	{-0.051,0.057}	0.0156	0.9915	0.0306	0.9933
1	75th-90th	{-1.47,2.03}	{-1.6,3.77}	{-1.7,5.67}	0.2127	1.5584	2.3243	1.4570
2	75th-90th	{-1.25,1.6}	{-1.36,2.73}	{-1.44,4.1}	0.1469	1.4687	1.6420	1.3803
5	75th-90th	{-0.94,1.09}	{-1.04,1.75}	{-1.11,2.51}	0.0837	1.3232	1.0066	1.2567
25	75th-90th	{-0.48,0.52}	{-0.57,0.76}	{-0.62,1.02}	0.0335	1.1542	0.4295	1.1307
50	75th-90th	{-0.35,0.4}	{-0.43,0.54}	{-0.48,0.71}	0.0224	1.1078	0.3050	1.0965
250	75th-90th	{-0.16,0.16}	{-0.2,0.21}	{-0.24,0.26}	0.0097	1.0503	0.1267	1.0421
1,000	75th-90th	{-0.083,0.076}	{-0.1,0.1}	{-0.12,0.12}	0.0049	1.0252	0.0618	1.0203
5,000	75th-90th	{-0.038,0.033}	{-0.047,0.045}	{-0.055,0.054}	0.0023	1.0116	0.0278	1.0091
1	90th-100th	{-2.83,2.99}	{-3.37,5.65}	{-3.94,8.78}	0.9668	2.9449	3.7723	2.5686
2	90th-100th	{-1.96,2.14}	{-2.26,3.71}	{-2.58,5.67}	0.5513	2.3134	2.3993	2.0741
5	90th-100th	{-1.25,1.27}	{-1.42,2.08}	{-1.59,3.11}	0.3445	1.7952	1.2931	1.6452
25	90th-100th	{-0.57,0.53}	{-0.67,0.77}	{-0.76,1.15}	0.2576	1.3452	0.5130	1.2694
50	90th-100th	{-0.41,0.39}	{-0.48,0.55}	{-0.55,0.73}	0.2102	1.2367	0.3668	1.1962
250	90th-100th	{-0.19,0.15}	{-0.23,0.2}	{-0.27,0.26}	0.1571	1.1231	0.1843	1.0993
1,000	90th-100th	{-0.092,0.07}	{-0.12,0.099}	{-0.14,0.13}	0.0737	1.0649	0.0888	1.0526
5,000	90th-100th	{-0.046,0.029}	{-0.06,0.039}	{-0.072,0.05}	0.0563	1.0426	0.0534	1.0340

Lag: HCC Using CY2006-7 Less CY07 Q3 & Q4

Accuracy Metrics

Group Size	R-Square	MAPE
1	8.9%	0.9809
2	9.1%	0.8087
5	9.3%	0.5851
25	10.3%	0.2949
50	13.4%	0.2143
250	19.2%	0.0992
1,000	21.1%	0.0499
5,000	37.8%	0.0226

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.19,1.39}	{-1.64,2.89}	{-2.15,4.74}	0.8170	0.9994	2.0731	1.0023
2	All	{-0.99,1.29}	{-1.28,2.29}	{-1.58,3.44}	0.5807	1.0005	1.4606	1.0030
5	All	{-0.75,0.96}	{-0.91,1.53}	{-1.07,2.19}	0.3683	0.9983	0.9297	0.9990
25	All	{-0.42,0.49}	{-0.51,0.72}	{-0.58,0.98}	0.1781	1.0004	0.4182	1.0020
50	All	{-0.32,0.36}	{-0.38,0.5}	{-0.44,0.65}	0.1387	1.0014	0.2998	0.9997
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.22,0.27}	0.0755	1.0006	0.1392	0.9995
1,000	All	{-0.079,0.08}	{-0.1,0.11}	{-0.12,0.13}	0.0419	0.9997	0.0705	0.9992
5,000	All	{-0.036,0.037}	{-0.046,0.047}	{-0.056,0.055}	0.0284	0.9999	0.0360	0.9998
1	0-75th	{-0.73,1.12}	{-0.86,2.37}	{-0.97,3.95}	0.2712	0.6336	1.5490	0.7157
2	0-75th	{-0.71,1.14}	{-0.83,2.04}	{-0.92,3.03}	0.2493	0.7333	1.1706	0.7929
5	0-75th	{-0.62,0.9}	{-0.71,1.43}	{-0.79,1.99}	0.1973	0.8301	0.7949	0.8648
25	0-75th	{-0.38,0.49}	{-0.46,0.7}	{-0.51,0.95}	0.1108	0.9250	0.3855	0.9440
50	0-75th	{-0.29,0.35}	{-0.36,0.5}	{-0.41,0.64}	0.0865	0.9473	0.2748	0.9565
250	0-75th	{-0.15,0.16}	{-0.18,0.22}	{-0.21,0.27}	0.0446	0.9751	0.1271	0.9787
1,000	0-75th	{-0.075,0.083}	{-0.096,0.11}	{-0.11,0.13}	0.0253	0.9859	0.0649	0.9883
5,000	0-75th	{-0.034,0.038}	{-0.043,0.048}	{-0.052,0.057}	0.0152	0.9916	0.0305	0.9932
1	75th-90th	{-1.47,2.06}	{-1.6,3.8}	{-1.69,5.79}	0.2091	1.5520	2.3485	1.4543
2	75th-90th	{-1.25,1.63}	{-1.36,2.8}	{-1.44,4.1}	0.1455	1.4635	1.6677	1.3802
5	75th-90th	{-0.95,1.09}	{-1.04,1.77}	{-1.11,2.56}	0.0833	1.3217	1.0400	1.2639
25	75th-90th	{-0.5,0.5}	{-0.58,0.76}	{-0.64,1.04}	0.0329	1.1535	0.4272	1.1181
50	75th-90th	{-0.36,0.37}	{-0.43,0.53}	{-0.48,0.68}	0.0226	1.1094	0.2958	1.0830
250	75th-90th	{-0.17,0.16}	{-0.21,0.21}	{-0.24,0.27}	0.0097	1.0497	0.1299	1.0388
1,000	75th-90th	{-0.085,0.074}	{-0.11,0.1}	{-0.13,0.12}	0.0050	1.0251	0.0626	1.0188
5,000	75th-90th	{-0.038,0.033}	{-0.048,0.044}	{-0.059,0.053}	0.0024	1.0118	0.0279	1.0091
1	90th-100th	{-2.86,2.84}	{-3.41,5.37}	{-3.99,8.5}	0.9534	2.9199	3.6915	2.4793
2	90th-100th	{-1.98,2.05}	{-2.3,3.59}	{-2.62,5.38}	0.5517	2.3092	2.3066	2.0127
5	90th-100th	{-1.27,1.24}	{-1.43,2.06}	{-1.59,3.11}	0.2852	1.7753	1.2922	1.6086
25	90th-100th	{-0.59,0.54}	{-0.67,0.83}	{-0.75,1.17}	0.1813	1.3362	0.4973	1.2632
50	90th-100th	{-0.4,0.39}	{-0.47,0.56}	{-0.54,0.72}	0.1921	1.2448	0.3703	1.1989
250	90th-100th	{-0.18,0.16}	{-0.22,0.21}	{-0.25,0.28}	0.1407	1.1178	0.1795	1.0970
1,000	90th-100th	{-0.093,0.074}	{-0.12,0.096}	{-0.14,0.12}	0.0776	1.0652	0.0891	1.0523
5,000	90th-100th	{-0.047,0.032}	{-0.061,0.043}	{-0.074,0.05}	0.0604	1.0441	0.0557	1.0354

Eligibility: HCC Using CY2007 Q2-4; 9 Months

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.2%	0.9607
2	12.4%	0.7905
5	12.8%	0.5708
25	13.9%	0.2906
50	15.5%	0.2096
250	22.0%	0.0970
1,000	30.5%	0.0490
5,000	41.2%	0.0218

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.15,1.34}	{-1.57,2.81}	{-2.05,4.6}	0.8143	1.0010	2.0875	1.0004
2	All	{-0.95,1.25}	{-1.23,2.23}	{-1.51,3.38}	0.5777	1.0011	1.4614	1.0018
5	All	{-0.73,0.93}	{-0.89,1.49}	{-1.04,2.14}	0.3767	1.0007	0.9252	0.9996
25	All	{-0.41,0.49}	{-0.49,0.73}	{-0.56,0.97}	0.1754	0.9987	0.4218	1.0043
50	All	{-0.31,0.35}	{-0.37,0.5}	{-0.43,0.65}	0.1323	0.9988	0.2967	0.9987
250	All	{-0.15,0.16}	{-0.18,0.21}	{-0.22,0.27}	0.0744	1.0003	0.1386	0.9991
1,000	All	{-0.077,0.08}	{-0.097,0.1}	{-0.12,0.13}	0.0463	1.0007	0.0739	1.0007
5,000	All	{-0.035,0.035}	{-0.044,0.046}	{-0.052,0.055}	0.0262	0.9997	0.0356	0.9999
1	0-75th	{-0.74,1.01}	{-0.86,2.18}	{-0.96,3.64}	0.2675	0.6387	1.4427	0.6791
2	0-75th	{-0.71,1.06}	{-0.82,1.91}	{-0.91,2.86}	0.2456	0.7363	1.1162	0.7666
5	0-75th	{-0.61,0.85}	{-0.71,1.35}	{-0.78,1.9}	0.1945	0.8315	0.7682	0.8487
25	0-75th	{-0.38,0.48}	{-0.45,0.69}	{-0.51,0.92}	0.1114	0.9248	0.3826	0.9384
50	0-75th	{-0.29,0.34}	{-0.35,0.48}	{-0.4,0.62}	0.0860	0.9455	0.2722	0.9504
250	0-75th	{-0.14,0.16}	{-0.18,0.21}	{-0.21,0.26}	0.0444	0.9745	0.1266	0.9757
1,000	0-75th	{-0.075,0.08}	{-0.094,0.1}	{-0.11,0.13}	0.0252	0.9862	0.0647	0.9875
5,000	0-75th	{-0.033,0.036}	{-0.043,0.046}	{-0.05,0.056}	0.0150	0.9919	0.0299	0.9930
1	75th-90th	{-1.44,2.08}	{-1.57,3.79}	{-1.67,5.73}	0.2050	1.5437	2.3460	1.4677
2	75th-90th	{-1.23,1.66}	{-1.34,2.81}	{-1.42,4.13}	0.1446	1.4566	1.6739	1.4015
5	75th-90th	{-0.93,1.13}	{-1.02,1.78}	{-1.1,2.57}	0.0830	1.3195	1.0227	1.2812
25	75th-90th	{-0.47,0.53}	{-0.56,0.79}	{-0.62,1.11}	0.0320	1.1512	0.4385	1.1407
50	75th-90th	{-0.34,0.38}	{-0.41,0.53}	{-0.45,0.7}	0.0223	1.1075	0.2969	1.1031
250	75th-90th	{-0.15,0.17}	{-0.19,0.22}	{-0.22,0.27}	0.0099	1.0494	0.1262	1.0482
1,000	75th-90th	{-0.079,0.08}	{-0.1,0.11}	{-0.12,0.13}	0.0049	1.0253	0.0627	1.0236
5,000	75th-90th	{-0.037,0.035}	{-0.047,0.044}	{-0.053,0.053}	0.0023	1.0115	0.0278	1.0101
1	90th-100th	{-2.71,3.34}	{-3.21,6.02}	{-3.78,9.16}	0.9770	2.9101	3.9600	2.7145
2	90th-100th	{-1.89,2.29}	{-2.19,3.89}	{-2.49,5.75}	0.5601	2.3060	2.4083	2.1674
5	90th-100th	{-1.22,1.37}	{-1.37,2.25}	{-1.52,3.25}	0.3625	1.7923	1.3306	1.7098
25	90th-100th	{-0.54,0.56}	{-0.63,0.88}	{-0.7,1.15}	0.1760	1.3243	0.4990	1.2935
50	90th-100th	{-0.4,0.39}	{-0.47,0.56}	{-0.53,0.71}	0.1540	1.2357	0.3408	1.2048
250	90th-100th	{-0.18,0.15}	{-0.22,0.2}	{-0.26,0.27}	0.1325	1.1200	0.1732	1.1004
1,000	90th-100th	{-0.089,0.081}	{-0.11,0.11}	{-0.13,0.13}	0.0950	1.0719	0.1058	1.0647
5,000	90th-100th	{-0.041,0.032}	{-0.052,0.042}	{-0.062,0.051}	0.0527	1.0410	0.0546	1.0368

Eligibility: HCC Using CY2007 Q3-4; 6 Months

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.2%	0.9651
2	12.2%	0.7925
5	12.9%	0.5736
25	15.1%	0.2885
50	19.3%	0.2118
250	22.1%	0.0971
1,000	27.7%	0.0492
5,000	47.4%	0.0220

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.13,1.37}	{-1.52,2.84}	{-1.96,4.64}	0.7820	1.0015	2.0724	1.0036
2	All	{-0.94,1.25}	{-1.2,2.23}	{-1.47,3.36}	0.5553	0.9987	1.4691	0.9992
5	All	{-0.72,0.94}	{-0.87,1.51}	{-1.01,2.16}	0.3587	1.0010	0.9304	1.0042
25	All	{-0.41,0.47}	{-0.49,0.7}	{-0.56,0.97}	0.1771	1.0001	0.4207	0.9975
50	All	{-0.31,0.35}	{-0.38,0.5}	{-0.43,0.66}	0.1452	1.0003	0.3063	0.9992
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.22,0.26}	0.0690	1.0002	0.1391	1.0003
1,000	All	{-0.078,0.08}	{-0.099,0.11}	{-0.12,0.13}	0.0412	0.9998	0.0729	0.9996
5,000	All	{-0.035,0.036}	{-0.044,0.046}	{-0.053,0.056}	0.0281	1.0005	0.0380	1.0006
1	0-75th	{-0.75,1.03}	{-0.87,2.22}	{-0.96,3.68}	0.2568	0.6544	1.4552	0.6879
2	0-75th	{-0.71,1.06}	{-0.82,1.9}	{-0.91,2.86}	0.2342	0.7452	1.1125	0.7660
5	0-75th	{-0.62,0.85}	{-0.71,1.35}	{-0.79,1.91}	0.1863	0.8386	0.7697	0.8515
25	0-75th	{-0.39,0.45}	{-0.46,0.67}	{-0.51,0.89}	0.1075	0.9271	0.3784	0.9311
50	0-75th	{-0.3,0.34}	{-0.36,0.48}	{-0.41,0.63}	0.0829	0.9485	0.2741	0.9510
250	0-75th	{-0.14,0.16}	{-0.18,0.22}	{-0.21,0.26}	0.0422	0.9759	0.1260	0.9776
1,000	0-75th	{-0.076,0.08}	{-0.097,0.1}	{-0.11,0.13}	0.0242	0.9863	0.0651	0.9870
5,000	0-75th	{-0.034,0.036}	{-0.043,0.046}	{-0.052,0.056}	0.0142	0.9924	0.0303	0.9930
1	75th-90th	{-1.41,2.03}	{-1.53,3.76}	{-1.63,5.66}	0.1935	1.5164	2.3089	1.4508
2	75th-90th	{-1.2,1.64}	{-1.3,2.74}	{-1.38,4.02}	0.1376	1.4268	1.6720	1.3795
5	75th-90th	{-0.91,1.15}	{-1.01,1.8}	{-1.08,2.55}	0.0806	1.3063	1.0359	1.2898
25	75th-90th	{-0.47,0.52}	{-0.55,0.8}	{-0.62,1.07}	0.0321	1.1469	0.4282	1.1274
50	75th-90th	{-0.35,0.37}	{-0.42,0.52}	{-0.47,0.7}	0.0215	1.1049	0.2971	1.0882
250	75th-90th	{-0.16,0.16}	{-0.2,0.22}	{-0.23,0.27}	0.0096	1.0477	0.1279	1.0443
1,000	75th-90th	{-0.079,0.08}	{-0.1,0.11}	{-0.12,0.13}	0.0047	1.0239	0.0626	1.0224
5,000	75th-90th	{-0.034,0.036}	{-0.044,0.046}	{-0.05,0.055}	0.0023	1.0113	0.0272	1.0116
1	90th-100th	{-2.62,3.41}	{-3.12,6.06}	{-3.62,9.24}	0.9572	2.8314	3.8918	2.6998
2	90th-100th	{-1.84,2.35}	{-2.13,3.95}	{-2.42,5.95}	0.5513	2.2563	2.4678	2.1764
5	90th-100th	{-1.18,1.42}	{-1.34,2.3}	{-1.49,3.27}	0.3183	1.7612	1.3390	1.7218
25	90th-100th	{-0.54,0.56}	{-0.63,0.87}	{-0.7,1.17}	0.2153	1.3272	0.5202	1.3006
50	90th-100th	{-0.37,0.41}	{-0.44,0.6}	{-0.5,0.78}	0.2612	1.2322	0.4007	1.2278
250	90th-100th	{-0.17,0.18}	{-0.22,0.23}	{-0.25,0.29}	0.1185	1.1113	0.1799	1.1048
1,000	90th-100th	{-0.088,0.081}	{-0.11,0.11}	{-0.12,0.14}	0.0781	1.0648	0.0997	1.0596
5,000	90th-100th	{-0.041,0.033}	{-0.053,0.045}	{-0.06,0.054}	0.0609	1.0453	0.0647	1.0413

Eligibility: HCC Using CY2007 Q4; 3 Months

Accuracy Metrics

Group Size	R-Square	MAPE
1	11.4%	0.9733
2	11.5%	0.7980
5	12.0%	0.5734
25	20.8%	0.2878
50	14.9%	0.2109
250	18.4%	0.0970
1,000	28.2%	0.0486
5,000	43.5%	0.0221

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.1,1.39}	{-1.46,2.86}	{-1.85,4.69}	0.7313	0.9998	2.0719	1.0008
2	All	{-0.93,1.26}	{-1.16,2.26}	{-1.4,3.4}	0.5173	0.9977	1.4560	0.9970
5	All	{-0.72,0.94}	{-0.86,1.5}	{-0.99,2.14}	0.3321	1.0010	0.9171	0.9993
25	All	{-0.41,0.48}	{-0.49,0.7}	{-0.55,0.94}	0.1966	1.0024	0.4321	0.9999
50	All	{-0.31,0.36}	{-0.37,0.51}	{-0.43,0.65}	0.1204	0.9990	0.2974	1.0018
250	All	{-0.15,0.16}	{-0.18,0.22}	{-0.21,0.27}	0.0606	1.0002	0.1362	1.0002
1,000	All	{-0.076,0.079}	{-0.097,0.1}	{-0.11,0.13}	0.0402	1.0004	0.0720	1.0006
5,000	All	{-0.035,0.036}	{-0.044,0.047}	{-0.053,0.056}	0.0254	1.0003	0.0369	1.0003
1	0-75th	{-0.77,1.04}	{-0.88,2.25}	{-0.96,3.75}	0.2393	0.6793	1.4981	0.6983
2	0-75th	{-0.72,1.07}	{-0.83,1.92}	{-0.9,2.9}	0.2155	0.7636	1.1327	0.7747
5	0-75th	{-0.62,0.86}	{-0.71,1.35}	{-0.78,1.91}	0.1718	0.8499	0.7724	0.8556
25	0-75th	{-0.39,0.46}	{-0.46,0.67}	{-0.52,0.89}	0.0987	0.9323	0.3736	0.9316
50	0-75th	{-0.3,0.35}	{-0.36,0.5}	{-0.41,0.63}	0.0758	0.9514	0.2769	0.9579
250	0-75th	{-0.15,0.16}	{-0.18,0.21}	{-0.21,0.26}	0.0391	0.9776	0.1263	0.9781
1,000	0-75th	{-0.075,0.078}	{-0.096,0.1}	{-0.11,0.12}	0.0217	0.9875	0.0636	0.9878
5,000	0-75th	{-0.035,0.036}	{-0.044,0.047}	{-0.052,0.056}	0.0132	0.9931	0.0300	0.9931
1	75th-90th	{-1.37,2.04}	{-1.49,3.72}	{-1.57,5.61}	0.1810	1.4681	2.2555	1.4135
2	75th-90th	{-1.17,1.63}	{-1.26,2.8}	{-1.33,4.01}	0.1253	1.3855	1.6502	1.3584
5	75th-90th	{-0.89,1.09}	{-0.99,1.73}	{-1.05,2.5}	0.0756	1.2834	0.9931	1.2557
25	75th-90th	{-0.46,0.52}	{-0.54,0.77}	{-0.61,1.01}	0.0299	1.1368	0.4220	1.1289
50	75th-90th	{-0.33,0.37}	{-0.41,0.52}	{-0.46,0.68}	0.0200	1.0957	0.2884	1.0890
250	75th-90th	{-0.15,0.16}	{-0.19,0.23}	{-0.22,0.29}	0.0088	1.0451	0.1266	1.0435
1,000	75th-90th	{-0.076,0.084}	{-0.1,0.11}	{-0.12,0.13}	0.0045	1.0232	0.0623	1.0241
5,000	75th-90th	{-0.037,0.037}	{-0.047,0.047}	{-0.055,0.059}	0.0020	1.0104	0.0285	1.0105
1	90th-100th	{-2.46,3.4}	{-2.98,6.06}	{-3.49,9.04}	0.9359	2.7020	3.8488	2.6505
2	90th-100th	{-1.76,2.33}	{-2.04,3.89}	{-2.32,5.71}	0.5385	2.1721	2.3797	2.1228
5	90th-100th	{-1.15,1.43}	{-1.29,2.26}	{-1.43,3.31}	0.2783	1.7114	1.3126	1.6937
25	90th-100th	{-0.52,0.6}	{-0.61,0.88}	{-0.67,1.2}	0.3784	1.3264	0.6262	1.3184
50	90th-100th	{-0.36,0.41}	{-0.43,0.56}	{-0.49,0.7}	0.1591	1.2109	0.3463	1.1997
250	90th-100th	{-0.16,0.17}	{-0.2,0.24}	{-0.23,0.29}	0.0894	1.1015	0.1582	1.1012
1,000	90th-100th	{-0.08,0.079}	{-0.098,0.1}	{-0.12,0.13}	0.0820	1.0628	0.0994	1.0618
5,000	90th-100th	{-0.037,0.035}	{-0.045,0.047}	{-0.054,0.056}	0.0552	1.0396	0.0603	1.0385

Turnover: HCC Using CY2007 (10% New Mbrs)

Accuracy Metrics

Group Size	R-Square	MAPE
1	11.3%	0.9693
2	11.3%	0.7976
5	11.1%	0.5774
25	15.1%	0.2915
50	12.6%	0.2136
250	19.8%	0.0975
1,000	25.3%	0.0488
5,000	43.3%	0.0220

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.12,1.37}	{-1.53,2.85}	{-2.01,4.68}	0.7904	1.0017	2.0756	1.0016
2	All	{-0.95,1.26}	{-1.22,2.26}	{-1.49,3.39}	0.5603	1.0006	1.4630	1.0015
5	All	{-0.73,0.95}	{-0.88,1.52}	{-1.03,2.15}	0.3548	0.9984	0.9275	1.0002
25	All	{-0.41,0.49}	{-0.5,0.72}	{-0.57,0.97}	0.1840	1.0003	0.4232	1.0012
50	All	{-0.31,0.36}	{-0.37,0.52}	{-0.43,0.67}	0.1224	0.9993	0.2979	0.9997
250	All	{-0.15,0.16}	{-0.19,0.21}	{-0.22,0.27}	0.0700	1.0007	0.1381	1.0008
1,000	All	{-0.078,0.08}	{-0.097,0.1}	{-0.11,0.12}	0.0411	0.9997	0.0710	0.9990
5,000	All	{-0.036,0.036}	{-0.046,0.046}	{-0.053,0.055}	0.0274	1.0001	0.0368	0.9998
1	0-75th	{-0.78,1.05}	{-0.9,2.27}	{-0.98,3.78}	0.2755	0.6580	1.5002	0.7013
2	0-75th	{-0.72,1.09}	{-0.82,1.95}	{-0.91,2.92}	0.2373	0.7454	1.1356	0.7767
5	0-75th	{-0.62,0.88}	{-0.71,1.39}	{-0.78,1.96}	0.1882	0.8365	0.7869	0.8593
25	0-75th	{-0.38,0.47}	{-0.46,0.68}	{-0.52,0.92}	0.1064	0.9273	0.3791	0.9370
50	0-75th	{-0.29,0.36}	{-0.35,0.51}	{-0.4,0.66}	0.0808	0.9480	0.2781	0.9549
250	0-75th	{-0.14,0.16}	{-0.18,0.21}	{-0.21,0.27}	0.0421	0.9763	0.1271	0.9792
1,000	0-75th	{-0.075,0.082}	{-0.095,0.11}	{-0.11,0.13}	0.0253	0.9863	0.0649	0.9876
5,000	0-75th	{-0.035,0.036}	{-0.044,0.046}	{-0.052,0.055}	0.0144	0.9923	0.0301	0.9927
1	75th-90th	{-1.39,1.98}	{-1.52,3.69}	{-1.62,5.65}	0.2088	1.4801	2.2704	1.4036
2	75th-90th	{-1.21,1.62}	{-1.31,2.74}	{-1.4,4.02}	0.1430	1.4294	1.6587	1.3685
5	75th-90th	{-0.92,1.08}	{-1.02,1.74}	{-1.09,2.46}	0.0803	1.3053	1.0193	1.2595
25	75th-90th	{-0.48,0.51}	{-0.55,0.75}	{-0.62,1.01}	0.0319	1.1455	0.4203	1.1230
50	75th-90th	{-0.34,0.37}	{-0.41,0.53}	{-0.46,0.72}	0.0218	1.1062	0.2953	1.0941
250	75th-90th	{-0.16,0.15}	{-0.2,0.21}	{-0.23,0.28}	0.0092	1.0479	0.1265	1.0417
1,000	75th-90th	{-0.081,0.076}	{-0.098,0.096}	{-0.12,0.12}	0.0047	1.0244	0.0606	1.0191
5,000	75th-90th	{-0.036,0.035}	{-0.046,0.046}	{-0.051,0.059}	0.0023	1.0113	0.0278	1.0101
1	90th-100th	{-2.67,3.26}	{-3.17,5.87}	{-3.72,9.01}	0.9635	2.8601	3.8508	2.6499
2	90th-100th	{-1.87,2.29}	{-2.17,3.9}	{-2.49,5.81}	0.5527	2.2715	2.3946	2.1367
5	90th-100th	{-1.21,1.37}	{-1.38,2.2}	{-1.51,3.17}	0.2766	1.7526	1.3052	1.6682
25	90th-100th	{-0.55,0.59}	{-0.66,0.89}	{-0.74,1.21}	0.2680	1.3300	0.5531	1.2996
50	90th-100th	{-0.39,0.37}	{-0.46,0.55}	{-0.51,0.72}	0.1143	1.2235	0.3333	1.1933
250	90th-100th	{-0.18,0.16}	{-0.22,0.22}	{-0.26,0.27}	0.1229	1.1130	0.1717	1.1014
1,000	90th-100th	{-0.091,0.079}	{-0.11,0.1}	{-0.13,0.12}	0.0763	1.0627	0.0939	1.0539
5,000	90th-100th	{-0.041,0.036}	{-0.052,0.045}	{-0.06,0.055}	0.0597	1.0416	0.0601	1.0377

Turnover: HCC Using CY2007 (30% New Mbrs)

Accuracy Metrics

Group Size	R-Square	MAPE
1	8.6%	0.9910
2	8.7%	0.8131
5	9.7%	0.5866
25	11.1%	0.2956
50	15.1%	0.2153
250	15.9%	0.0992
1,000	22.1%	0.0506
5,000	37.0%	0.0223

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.07,1.42}	{-1.37,2.92}	{-1.83,4.75}	0.6952	0.9989	2.0570	0.9971
2	All	{-0.93,1.29}	{-1.15,2.29}	{-1.41,3.46}	0.4947	0.9995	1.4461	0.9948
5	All	{-0.73,0.96}	{-0.86,1.55}	{-1,2.21}	0.3195	0.9998	0.9252	1.0007
25	All	{-0.42,0.49}	{-0.5,0.72}	{-0.57,0.96}	0.1560	1.0006	0.4202	1.0004
50	All	{-0.31,0.37}	{-0.38,0.52}	{-0.43,0.68}	0.1315	1.0008	0.3064	1.0049
250	All	{-0.15,0.17}	{-0.19,0.22}	{-0.22,0.27}	0.0600	0.9998	0.1366	0.9999
1,000	All	{-0.08,0.083}	{-0.1,0.11}	{-0.12,0.13}	0.0380	0.9997	0.0718	0.9997
5,000	All	{-0.036,0.036}	{-0.046,0.046}	{-0.053,0.055}	0.0245	1.0002	0.0352	1.0000
1	0-75th	{-0.84,1.14}	{-0.94,2.44}	{-1.01,4.06}	0.2722	0.7156	1.6407	0.7506
2	0-75th	{-0.75,1.14}	{-0.84,2.04}	{-0.91,3.06}	0.2098	0.7815	1.2061	0.8063
5	0-75th	{-0.63,0.9}	{-0.72,1.42}	{-0.79,2.02}	0.1621	0.8559	0.7980	0.8719
25	0-75th	{-0.39,0.48}	{-0.47,0.69}	{-0.53,0.93}	0.0942	0.9362	0.3860	0.9429
50	0-75th	{-0.29,0.36}	{-0.36,0.51}	{-0.41,0.67}	0.0732	0.9543	0.2815	0.9649
250	0-75th	{-0.15,0.17}	{-0.19,0.22}	{-0.22,0.26}	0.0388	0.9786	0.1278	0.9798
1,000	0-75th	{-0.077,0.084}	{-0.097,0.11}	{-0.11,0.13}	0.0224	0.9877	0.0661	0.9893
5,000	0-75th	{-0.035,0.037}	{-0.045,0.046}	{-0.052,0.056}	0.0129	0.9934	0.0298	0.9942
1	75th-90th	{-1.23,1.93}	{-1.33,3.55}	{-1.42,5.37}	0.1593	1.3192	2.1476	1.2798
2	75th-90th	{-1.14,1.55}	{-1.23,2.65}	{-1.31,3.88}	0.1285	1.3334	1.5431	1.2775
5	75th-90th	{-0.9,1.07}	{-0.99,1.75}	{-1.06,2.48}	0.0735	1.2627	0.9929	1.2252
25	75th-90th	{-0.49,0.49}	{-0.56,0.75}	{-0.62,0.98}	0.0286	1.1293	0.4224	1.1047
50	75th-90th	{-0.34,0.38}	{-0.41,0.55}	{-0.46,0.72}	0.0196	1.0926	0.3012	1.0874
250	75th-90th	{-0.16,0.18}	{-0.2,0.23}	{-0.23,0.28}	0.0082	1.0421	0.1317	1.0438
1,000	75th-90th	{-0.084,0.079}	{-0.1,0.11}	{-0.12,0.13}	0.0042	1.0211	0.0635	1.0171
5,000	75th-90th	{-0.039,0.033}	{-0.047,0.043}	{-0.056,0.052}	0.0020	1.0100	0.0281	1.0076
1	90th-100th	{-2.49,2.94}	{-3,5.36}	{-3.55,8.26}	0.9452	2.6094	3.5462	2.3920
2	90th-100th	{-1.78,2.13}	{-2.07,3.63}	{-2.37,5.4}	0.5310	2.1340	2.2506	1.9845
5	90th-100th	{-1.16,1.37}	{-1.31,2.23}	{-1.45,3.19}	0.2957	1.6846	1.3076	1.6297
25	90th-100th	{-0.53,0.62}	{-0.63,0.89}	{-0.7,1.19}	0.1894	1.2900	0.5133	1.2756
50	90th-100th	{-0.39,0.37}	{-0.46,0.55}	{-0.51,0.78}	0.2428	1.2116	0.3942	1.1815
250	90th-100th	{-0.17,0.16}	{-0.21,0.22}	{-0.24,0.28}	0.0964	1.0959	0.1580	1.0843
1,000	90th-100th	{-0.089,0.078}	{-0.11,0.11}	{-0.13,0.13}	0.0742	1.0576	0.0940	1.0517
5,000	90th-100th	{-0.041,0.035}	{-0.05,0.044}	{-0.059,0.055}	0.0546	1.0364	0.0563	1.0321

Data Quality: HCC Using CY2007 (Ignore Inpatient Dx)

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.25%	0.9536
2	12.2%	0.7882
5	13.1%	0.5700
25	14.7%	0.2874
50	20.2%	0.2098
250	21.5%	0.0968
1,000	28.9%	0.0489
5,000	45.2%	0.0219

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.16,1.34}	{-1.59,2.79}	{-2.08,4.59}	0.8244	0.9992	2.0442	0.9951
2	All	{-0.96,1.24}	{-1.24,2.21}	{-1.53,3.33}	0.5857	0.9999	1.4595	0.9981
5	All	{-0.73,0.93}	{-0.89,1.49}	{-1.04,2.13}	0.3775	1.0004	0.9211	0.9974
25	All	{-0.41,0.47}	{-0.5,0.7}	{-0.56,0.93}	0.1861	1.0004	0.4159	0.9980
50	All	{-0.31,0.35}	{-0.37,0.51}	{-0.43,0.66}	0.1536	1.0007	0.3075	1.0011
250	All	{-0.15,0.16}	{-0.19,0.21}	{-0.22,0.26}	0.0741	1.0005	0.1380	0.9996
1,000	All	{-0.078,0.079}	{-0.098,0.1}	{-0.11,0.13}	0.0454	0.9995	0.0728	0.9980
5,000	All	{-0.036,0.035}	{-0.045,0.045}	{-0.054,0.054}	0.0293	1.0006	0.0372	1.0002
1	0-75th	{-0.73,1.01}	{-0.86,2.18}	{-0.96,3.64}	0.2732	0.6280	1.4320	0.6757
2	0-75th	{-0.71,1.06}	{-0.82,1.89}	{-0.91,2.83}	0.2522	0.7303	1.1043	0.7624
5	0-75th	{-0.61,0.85}	{-0.71,1.35}	{-0.79,1.9}	0.2010	0.8295	0.7650	0.8454
25	0-75th	{-0.38,0.46}	{-0.45,0.67}	{-0.51,0.89}	0.1132	0.9240	0.3751	0.9308
50	0-75th	{-0.29,0.34}	{-0.35,0.49}	{-0.4,0.64}	0.0881	0.9450	0.2762	0.9530
250	0-75th	{-0.14,0.16}	{-0.18,0.21}	{-0.21,0.26}	0.0445	0.9744	0.1254	0.9761
1,000	0-75th	{-0.075,0.08}	{-0.095,0.1}	{-0.11,0.13}	0.0266	0.9852	0.0646	0.9854
5,000	0-75th	{-0.034,0.036}	{-0.043,0.046}	{-0.051,0.055}	0.0152	0.9922	0.0302	0.9930
1	75th-90th	{-1.46,2.04}	{-1.59,3.77}	{-1.69,5.64}	0.2149	1.5596	2.3050	1.4623
2	75th-90th	{-1.24,1.63}	{-1.35,2.75}	{-1.43,4.05}	0.1474	1.4698	1.6794	1.4003
5	75th-90th	{-0.93,1.11}	{-1.03,1.76}	{-1.1,2.53}	0.0842	1.3271	1.0148	1.2827
25	75th-90th	{-0.47,0.52}	{-0.55,0.78}	{-0.61,1.03}	0.0329	1.1544	0.4192	1.1386
50	75th-90th	{-0.34,0.36}	{-0.4,0.52}	{-0.45,0.67}	0.0232	1.1103	0.2898	1.0949
250	75th-90th	{-0.16,0.16}	{-0.2,0.22}	{-0.22,0.27}	0.0098	1.0505	0.1268	1.0462
1,000	75th-90th	{-0.08,0.08}	{-0.1,0.1}	{-0.12,0.13}	0.0048	1.0253	0.0629	1.0218
5,000	75th-90th	{-0.038,0.032}	{-0.048,0.043}	{-0.057,0.053}	0.0024	1.0122	0.0278	1.0100
1	90th-100th	{-2.74,3.26}	{-3.26,5.89}	{-3.8,8.9}	0.9521	2.9379	3.8048	2.6861
2	90th-100th	{-1.91,2.26}	{-2.19,3.92}	{-2.51,5.9}	0.5560	2.3171	2.4313	2.1622
5	90th-100th	{-1.22,1.39}	{-1.38,2.22}	{-1.52,3.22}	0.3231	1.7924	1.3218	1.7094
25	90th-100th	{-0.55,0.54}	{-0.64,0.79}	{-0.7,1.09}	0.2283	1.3427	0.5112	1.2919
50	90th-100th	{-0.39,0.4}	{-0.47,0.57}	{-0.54,0.71}	0.2677	1.2537	0.4105	1.2210
250	90th-100th	{-0.18,0.16}	{-0.22,0.22}	{-0.25,0.27}	0.1283	1.1210	0.1721	1.1057
1,000	90th-100th	{-0.093,0.074}	{-0.11,0.1}	{-0.13,0.13}	0.0898	1.0677	0.1011	1.0570
5,000	90th-100th	{-0.045,0.03}	{-0.057,0.039}	{-0.067,0.048}	0.0631	1.0464	0.0617	1.0393

Data Quality: HCC Using CY2007 (Ignore Outpatient Dx)

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.4%	0.9584
2	12.3%	0.7920
5	12.8%	0.5717
25	14.3%	0.2902
50	17.9%	0.2091
250	22.4%	0.0976
1,000	28.6%	0.0495
5,000	43.3%	0.0218

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.16,1.35}	{-1.59,2.82}	{-2.08,4.6}	0.8298	1.0008	2.0698	1.0027
2	All	{-0.97,1.25}	{-1.25,2.23}	{-1.54,3.36}	0.5868	1.0008	1.4655	1.0031
5	All	{-0.73,0.94}	{-0.89,1.5}	{-1.05,2.13}	0.3781	1.0001	0.9290	1.0015
25	All	{-0.41,0.48}	{-0.5,0.71}	{-0.57,0.96}	0.1839	0.9995	0.4249	1.0012
50	All	{-0.31,0.35}	{-0.37,0.5}	{-0.43,0.65}	0.1427	1.0004	0.3014	1.0002
250	All	{-0.15,0.16}	{-0.19,0.21}	{-0.22,0.27}	0.0761	1.0001	0.1399	0.9982
1,000	All	{-0.078,0.081}	{-0.096,0.11}	{-0.12,0.13}	0.0459	0.9998	0.0733	1.0001
5,000	All	{-0.034,0.035}	{-0.044,0.046}	{-0.053,0.056}	0.0274	0.9998	0.0364	1.0000
1	0-75th	{-0.73,1.01}	{-0.86,2.2}	{-0.96,3.66}	0.2719	0.6293	1.4415	0.6804
2	0-75th	{-0.7,1.07}	{-0.82,1.91}	{-0.91,2.85}	0.2506	0.7308	1.1098	0.7672
5	0-75th	{-0.61,0.86}	{-0.71,1.35}	{-0.79,1.9}	0.1997	0.8277	0.7695	0.8486
25	0-75th	{-0.38,0.46}	{-0.45,0.67}	{-0.51,0.91}	0.1133	0.9229	0.3819	0.9331
50	0-75th	{-0.29,0.34}	{-0.35,0.48}	{-0.4,0.62}	0.0905	0.9456	0.2721	0.9518
250	0-75th	{-0.14,0.16}	{-0.18,0.22}	{-0.21,0.27}	0.0451	0.9738	0.1279	0.9759
1,000	0-75th	{-0.075,0.081}	{-0.093,0.11}	{-0.11,0.13}	0.0264	0.9852	0.0649	0.9873
5,000	0-75th	{-0.033,0.036}	{-0.042,0.047}	{-0.052,0.057}	0.0158	0.9917	0.0305	0.9931
1	75th-90th	{-1.46,2.07}	{-1.59,3.76}	{-1.69,5.64}	0.2141	1.5580	2.2942	1.4628
2	75th-90th	{-1.24,1.61}	{-1.35,2.72}	{-1.44,3.98}	0.1475	1.4682	1.6529	1.3924
5	75th-90th	{-0.93,1.1}	{-1.03,1.75}	{-1.1,2.51}	0.0850	1.3277	1.0220	1.2819
25	75th-90th	{-0.48,0.53}	{-0.56,0.79}	{-0.63,1.06}	0.0340	1.1538	0.4407	1.1406
50	75th-90th	{-0.35,0.38}	{-0.41,0.53}	{-0.46,0.69}	0.0227	1.1109	0.2945	1.0954
250	75th-90th	{-0.17,0.15}	{-0.2,0.2}	{-0.23,0.27}	0.0098	1.0499	0.1259	1.0382
1,000	75th-90th	{-0.08,0.084}	{-0.1,0.11}	{-0.12,0.13}	0.0048	1.0250	0.0641	1.0233
5,000	75th-90th	{-0.035,0.034}	{-0.045,0.044}	{-0.052,0.053}	0.0022	1.0117	0.0270	1.0102
1	90th-100th	{-2.76,3.33}	{-3.28,6.01}	{-3.83,9.18}	0.9737	2.9544	3.9099	2.7326
2	90th-100th	{-1.93,2.34}	{-2.23,4.04}	{-2.53,6.09}	0.5564	2.3256	2.4678	2.1894
5	90th-100th	{-1.24,1.41}	{-1.4,2.29}	{-1.56,3.31}	0.3059	1.8020	1.3432	1.7278
25	90th-100th	{-0.56,0.56}	{-0.65,0.85}	{-0.74,1.23}	0.2065	1.3428	0.5154	1.3029
50	90th-100th	{-0.39,0.38}	{-0.46,0.56}	{-0.52,0.75}	0.2013	1.2455	0.3791	1.2199
250	90th-100th	{-0.18,0.15}	{-0.21,0.21}	{-0.25,0.27}	0.1359	1.1230	0.1776	1.1056
1,000	90th-100th	{-0.093,0.077}	{-0.11,0.1}	{-0.13,0.13}	0.0908	1.0709	0.1014	1.0614
5,000	90th-100th	{-0.042,0.032}	{-0.056,0.043}	{-0.064,0.052}	0.0560	1.0423	0.0580	1.0368

Data Quality: HCC Using CY2007 (Ignore Professional Dx)

Accuracy Metrics

Group Size	R-Square	MAPE
1	9.3%	0.9952
2	9.4%	0.8125
5	9.3%	0.5837
25	11.2%	0.2955
50	14.1%	0.2134
250	17.0%	0.0981
1,000	24.1%	0.0504
5,000	34.3%	0.0222

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.09,1.42}	{-1.43,2.95}	{-1.81,4.81}	0.6681	1.0007	2.0822	1.0040
2	All	{-0.93,1.29}	{-1.15,2.31}	{-1.39,3.46}	0.4744	1.0004	1.4590	0.9994
5	All	{-0.73,0.96}	{-0.86,1.53}	{-0.99,2.18}	0.3020	1.0000	0.9226	0.9982
25	All	{-0.42,0.49}	{-0.5,0.73}	{-0.56,0.98}	0.1483	0.9998	0.4216	1.0034
50	All	{-0.31,0.36}	{-0.38,0.52}	{-0.43,0.67}	0.1159	1.0011	0.3021	1.0034
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.22,0.27}	0.0610	0.9996	0.1367	1.0004
1,000	All	{-0.078,0.083}	{-0.099,0.11}	{-0.12,0.13}	0.0377	1.0001	0.0724	1.0011
5,000	All	{-0.035,0.036}	{-0.045,0.047}	{-0.053,0.057}	0.0216	0.9998	0.0344	0.9997
1	0-75th	{-0.79,1.08}	{-0.9,2.33}	{-0.98,3.89}	0.2229	0.7091	1.5470	0.7217
2	0-75th	{-0.74,1.1}	{-0.83,1.99}	{-0.91,2.98}	0.1982	0.7854	1.1655	0.7941
5	0-75th	{-0.64,0.89}	{-0.73,1.4}	{-0.79,1.97}	0.1566	0.8621	0.7917	0.8684
25	0-75th	{-0.39,0.48}	{-0.46,0.69}	{-0.52,0.92}	0.0902	0.9381	0.3845	0.9452
50	0-75th	{-0.3,0.35}	{-0.36,0.5}	{-0.41,0.65}	0.0706	0.9563	0.2765	0.9594
250	0-75th	{-0.15,0.16}	{-0.18,0.22}	{-0.21,0.27}	0.0368	0.9790	0.1270	0.9812
1,000	0-75th	{-0.077,0.082}	{-0.098,0.11}	{-0.11,0.13}	0.0208	0.9886	0.0653	0.9900
5,000	0-75th	{-0.035,0.037}	{-0.044,0.047}	{-0.052,0.057}	0.0123	0.9934	0.0298	0.9938
1	75th-90th	{-1.33,2.13}	{-1.44,3.85}	{-1.52,5.94}	0.1678	1.4193	2.4104	1.4241
2	75th-90th	{-1.16,1.71}	{-1.25,2.85}	{-1.32,4.12}	0.1168	1.3557	1.6317	1.3441
5	75th-90th	{-0.89,1.12}	{-0.98,1.79}	{-1.05,2.61}	0.0699	1.2575	1.0467	1.2508
25	75th-90th	{-0.47,0.53}	{-0.55,0.79}	{-0.61,1.07}	0.0273	1.1240	0.4323	1.1174
50	75th-90th	{-0.35,0.39}	{-0.41,0.55}	{-0.47,0.69}	0.0189	1.0910	0.2994	1.0849
250	75th-90th	{-0.16,0.17}	{-0.19,0.22}	{-0.23,0.27}	0.0078	1.0402	0.1280	1.0406
1,000	75th-90th	{-0.082,0.082}	{-0.1,0.11}	{-0.12,0.13}	0.0040	1.0202	0.0637	1.0200
5,000	75th-90th	{-0.036,0.035}	{-0.045,0.046}	{-0.051,0.053}	0.0019	1.0093	0.0272	1.0081
1	90th-100th	{-2.38,3.31}	{-2.88,5.89}	{-3.41,8.87}	0.8465	2.5616	3.6919	2.4931
2	90th-100th	{-1.73,2.24}	{-2,3.83}	{-2.26,5.84}	0.4852	2.0784	2.3576	2.0206
5	90th-100th	{-1.13,1.32}	{-1.26,2.14}	{-1.39,3.04}	0.2463	1.6467	1.2618	1.5920
25	90th-100th	{-0.52,0.6}	{-0.62,0.91}	{-0.69,1.31}	0.1717	1.2768	0.5223	1.2686
50	90th-100th	{-0.36,0.44}	{-0.43,0.62}	{-0.49,0.84}	0.1695	1.2024	0.3706	1.2109
250	90th-100th	{-0.17,0.16}	{-0.22,0.23}	{-0.25,0.3}	0.1123	1.0928	0.1707	1.0837
1,000	90th-100th	{-0.083,0.085}	{-0.11,0.12}	{-0.12,0.13}	0.0786	1.0565	0.0996	1.0554
5,000	90th-100th	{-0.04,0.035}	{-0.051,0.048}	{-0.06,0.06}	0.0440	1.0336	0.0516	1.0318

Baseline: Age/Gender Slope using CY2007 Allowed Cost

Accuracy Metrics

Group Size	R-Square	MAPE
1	0.5%	1.0792
2	0.5%	0.8725
5	0.5%	0.6223
25	0.6%	0.3084
50	0.8%	0.2241
250	1.3%	0.1032
1,000	1.7%	0.0524
5,000	2.7%	0.0231

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.02,1.6}	{-1.09,3.23}	{-1.13,5.16}	0.1467	1.0002	2.0425	0.9975
2	All	{-0.9,1.41}	{-0.97,2.46}	{-1.02,3.68}	0.1043	1.0000	1.4464	0.9954
5	All	{-0.75,1.04}	{-0.82,1.66}	{-0.87,2.35}	0.0668	0.9999	0.9204	0.9997
25	All	{-0.44,0.52}	{-0.52,0.76}	{-0.58,1.01}	0.0331	0.9998	0.4115	0.9980
50	All	{-0.33,0.38}	{-0.39,0.54}	{-0.44,0.69}	0.0251	1.0001	0.2919	0.9989
250	All	{-0.16,0.17}	{-0.2,0.23}	{-0.23,0.28}	0.0133	1.0001	0.1309	1.0007
1,000	All	{-0.083,0.086}	{-0.1,0.11}	{-0.12,0.14}	0.0080	1.0001	0.0665	0.9997
5,000	All	{-0.037,0.037}	{-0.047,0.048}	{-0.056,0.058}	0.0046	1.0001	0.0295	0.9998
1	0-75th	{-0.93,1.46}	{-0.99,3.09}	{-1.03,5.06}	0.1065	0.9275	2.0190	0.9243
2	0-75th	{-0.86,1.36}	{-0.92,2.4}	{-0.96,3.63}	0.0752	0.9546	1.4254	0.9492
5	0-75th	{-0.74,1.02}	{-0.8,1.64}	{-0.85,2.34}	0.0487	0.9715	0.9126	0.9717
25	0-75th	{-0.44,0.51}	{-0.51,0.75}	{-0.57,1}	0.0240	0.9866	0.4081	0.9843
50	0-75th	{-0.33,0.38}	{-0.39,0.54}	{-0.44,0.69}	0.0184	0.9906	0.2913	0.9880
250	0-75th	{-0.16,0.17}	{-0.2,0.23}	{-0.23,0.28}	0.0100	0.9954	0.1301	0.9950
1,000	0-75th	{-0.083,0.085}	{-0.1,0.11}	{-0.12,0.13}	0.0059	0.9974	0.0660	0.9966
5,000	0-75th	{-0.037,0.037}	{-0.047,0.048}	{-0.055,0.059}	0.0034	0.9985	0.0292	0.9982
1	75th-90th	{-1.09,1.84}	{-1.12,3.35}	{-1.13,4.98}	0.0144	1.1456	2.0046	1.1350
2	75th-90th	{-0.98,1.5}	{-1.03,2.57}	{-1.06,3.77}	0.0194	1.1067	1.4878	1.1017
5	75th-90th	{-0.79,1.08}	{-0.86,1.7}	{-0.91,2.4}	0.0117	1.0641	0.9297	1.0666
25	75th-90th	{-0.44,0.54}	{-0.53,0.77}	{-0.59,1.02}	0.0050	1.0280	0.4163	1.0290
50	75th-90th	{-0.33,0.37}	{-0.4,0.54}	{-0.45,0.69}	0.0037	1.0200	0.2872	1.0220
250	75th-90th	{-0.16,0.18}	{-0.2,0.24}	{-0.23,0.28}	0.0017	1.0091	0.1302	1.0131
1,000	75th-90th	{-0.081,0.086}	{-0.1,0.11}	{-0.12,0.14}	0.0009	1.0047	0.0656	1.0051
5,000	75th-90th	{-0.037,0.039}	{-0.046,0.049}	{-0.056,0.057}	0.0005	1.0024	0.0291	1.0030
1	90th-100th	{-1.17,2.01}	{-1.21,3.85}	{-1.24,5.88}	0.0489	1.2202	2.2019	1.2327
2	90th-100th	{-1.04,1.62}	{-1.09,2.69}	{-1.13,3.87}	0.0331	1.1774	1.5137	1.1793
5	90th-100th	{-0.82,1.06}	{-0.9,1.69}	{-0.95,2.38}	0.0264	1.1169	0.9513	1.1086
25	90th-100th	{-0.45,0.53}	{-0.54,0.76}	{-0.6,1.05}	0.0299	1.0563	0.4220	1.0543
50	90th-100th	{-0.33,0.38}	{-0.4,0.56}	{-0.46,0.72}	0.0276	1.0416	0.2963	1.0466
250	90th-100th	{-0.16,0.18}	{-0.2,0.24}	{-0.23,0.29}	0.0166	1.0214	0.1339	1.0250
1,000	90th-100th	{-0.083,0.091}	{-0.1,0.12}	{-0.12,0.14}	0.0106	1.0133	0.0686	1.0150
5,000	90th-100th	{-0.039,0.038}	{-0.048,0.049}	{-0.058,0.061}	0.0057	1.0080	0.0306	1.0071

Standard Model: HCC Using CY2007 Claims

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.4%	0.9532
2	12.7%	0.7898
5	13.8%	0.5728
25	16.5%	0.2847
50	21.1%	0.2106
250	40.3%	0.0977
1,000	56.6%	0.0493
5,000	69.7%	0.0224

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.16,1.33}	{-1.6,2.8}	{-2.08,4.59}	0.8244	0.9987	2.0509	0.9966
2	All	{-0.96,1.25}	{-1.25,2.24}	{-1.53,3.38}	0.5909	1.0007	1.4648	1.0031
5	All	{-0.73,0.94}	{-0.89,1.51}	{-1.04,2.15}	0.3891	1.0008	0.9355	1.0029
25	All	{-0.41,0.47}	{-0.5,0.69}	{-0.57,0.92}	0.1944	1.0000	0.4159	0.9964
50	All	{-0.31,0.35}	{-0.38,0.5}	{-0.43,0.66}	0.1648	1.0004	0.3107	1.0010
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.22,0.27}	0.1190	1.0004	0.1611	0.9998
1,000	All	{-0.077,0.081}	{-0.097,0.11}	{-0.11,0.13}	0.0794	1.0001	0.0943	1.0004
5,000	All	{-0.035,0.036}	{-0.045,0.046}	{-0.053,0.057}	0.0493	0.9992	0.0510	0.9995
1	0-75th	{-0.73,1}	{-0.86,2.18}	{-0.96,3.65}	0.2742	0.6284	1.4204	0.6758
2	0-75th	{-0.7,1.07}	{-0.82,1.91}	{-0.91,2.86}	0.2520	0.7287	1.1079	0.7637
5	0-75th	{-0.61,0.86}	{-0.71,1.36}	{-0.79,1.91}	0.2033	0.8270	0.7716	0.8481
25	0-75th	{-0.38,0.45}	{-0.45,0.66}	{-0.51,0.87}	0.1186	0.9207	0.3693	0.9264
50	0-75th	{-0.29,0.34}	{-0.35,0.49}	{-0.4,0.65}	0.0956	0.9420	0.2767	0.9485
250	0-75th	{-0.15,0.16}	{-0.18,0.22}	{-0.21,0.27}	0.0668	0.9705	0.1338	0.9737
1,000	0-75th	{-0.075,0.081}	{-0.094,0.11}	{-0.11,0.13}	0.0430	0.9818	0.0718	0.9843
5,000	0-75th	{-0.033,0.037}	{-0.043,0.047}	{-0.05,0.058}	0.0280	0.9876	0.0368	0.9895
1	75th-90th	{-1.46,2.03}	{-1.59,3.72}	{-1.69,5.62}	0.2143	1.5584	2.2542	1.4541
2	75th-90th	{-1.24,1.64}	{-1.35,2.79}	{-1.44,4.01}	0.1491	1.4708	1.6496	1.4022
5	75th-90th	{-0.93,1.12}	{-1.03,1.78}	{-1.1,2.56}	0.0840	1.3284	1.0217	1.2885
25	75th-90th	{-0.47,0.5}	{-0.56,0.76}	{-0.63,1.03}	0.0339	1.1552	0.4265	1.1407
50	75th-90th	{-0.35,0.35}	{-0.42,0.53}	{-0.47,0.69}	0.0228	1.1106	0.2968	1.0951
250	75th-90th	{-0.16,0.16}	{-0.2,0.23}	{-0.23,0.28}	0.0100	1.0502	0.1294	1.0457
1,000	75th-90th	{-0.08,0.079}	{-0.1,0.11}	{-0.12,0.14}	0.0051	1.0258	0.0631	1.0231
5,000	75th-90th	{-0.037,0.033}	{-0.047,0.045}	{-0.053,0.054}	0.0025	1.0117	0.0279	1.0097
1	90th-100th	{-2.74,3.34}	{-3.27,6.04}	{-3.83,9.14}	0.9536	2.9363	3.9069	2.7155
2	90th-100th	{-1.93,2.33}	{-2.22,4}	{-2.54,6.04}	0.5610	2.3354	2.4641	2.1992
5	90th-100th	{-1.22,1.38}	{-1.39,2.27}	{-1.55,3.32}	0.3845	1.8122	1.3722	1.7348
25	90th-100th	{-0.56,0.56}	{-0.65,0.81}	{-0.73,1.11}	0.2388	1.3612	0.5203	1.3051
50	90th-100th	{-0.39,0.39}	{-0.48,0.57}	{-0.54,0.75}	0.2904	1.2726	0.4018	1.2531
250	90th-100th	{-0.18,0.15}	{-0.23,0.21}	{-0.27,0.27}	0.2745	1.1498	0.2755	1.1267
1,000	90th-100th	{-0.093,0.077}	{-0.12,0.1}	{-0.15,0.12}	0.1899	1.0986	0.1845	1.0871
5,000	90th-100th	{-0.047,0.028}	{-0.062,0.038}	{-0.078,0.05}	0.1119	1.0675	0.1016	1.0584

Lag: HCC Using CY2006-7 Less CY07 Q4

Accuracy Metrics

Group Size	R-Square	MAPE
1	9.9%	0.9714
2	10.3%	0.8010
5	10.3%	0.5775
25	12.6%	0.2925
50	19.3%	0.2126
250	30.5%	0.0984
1,000	48.0%	0.0497
5,000	60.1%	0.0227

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.18,1.37}	{-1.62,2.85}	{-2.13,4.67}	0.8226	0.9995	2.0735	1.0008
2	All	{-0.98,1.26}	{-1.27,2.26}	{-1.57,3.39}	0.5881	1.0010	1.4612	0.9999
5	All	{-0.74,0.94}	{-0.91,1.51}	{-1.06,2.16}	0.3758	0.9965	0.9234	0.9968
25	All	{-0.42,0.48}	{-0.5,0.71}	{-0.57,0.97}	0.1856	0.9954	0.4197	0.9959
50	All	{-0.31,0.35}	{-0.38,0.51}	{-0.45,0.65}	0.1667	1.0008	0.3083	0.9998
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.22,0.27}	0.1073	1.0000	0.1503	0.9998
1,000	All	{-0.079,0.08}	{-0.1,0.1}	{-0.12,0.13}	0.0768	1.0007	0.0876	0.9999
5,000	All	{-0.035,0.038}	{-0.046,0.048}	{-0.056,0.057}	0.0448	1.0000	0.0459	1.0003
1	0-75th	{-0.73,1.07}	{-0.86,2.3}	{-0.96,3.83}	0.2720	0.6303	1.5064	0.7009
2	0-75th	{-0.71,1.11}	{-0.83,1.98}	{-0.92,2.96}	0.2512	0.7310	1.1503	0.7807
5	0-75th	{-0.61,0.88}	{-0.71,1.41}	{-0.79,1.98}	0.2018	0.8255	0.7903	0.8592
25	0-75th	{-0.38,0.48}	{-0.46,0.69}	{-0.52,0.93}	0.1237	0.9182	0.3855	0.9332
50	0-75th	{-0.29,0.35}	{-0.35,0.5}	{-0.41,0.64}	0.0946	0.9432	0.2754	0.9519
250	0-75th	{-0.14,0.17}	{-0.18,0.22}	{-0.21,0.27}	0.0644	0.9705	0.1327	0.9762
1,000	0-75th	{-0.075,0.081}	{-0.096,0.1}	{-0.11,0.12}	0.0405	0.9824	0.0695	0.9846
5,000	0-75th	{-0.033,0.039}	{-0.042,0.049}	{-0.051,0.058}	0.0235	0.9885	0.0341	0.9908
1	75th-90th	{-1.47,2.02}	{-1.6,3.72}	{-1.69,5.69}	0.2118	1.5544	2.3351	1.4547
2	75th-90th	{-1.25,1.61}	{-1.36,2.77}	{-1.44,4.07}	0.1483	1.4668	1.6478	1.3842
5	75th-90th	{-0.94,1.06}	{-1.04,1.71}	{-1.11,2.44}	0.0845	1.3236	1.0044	1.2538
25	75th-90th	{-0.48,0.52}	{-0.56,0.79}	{-0.63,1.06}	0.0334	1.1541	0.4328	1.1315
50	75th-90th	{-0.35,0.36}	{-0.42,0.52}	{-0.47,0.69}	0.0231	1.1098	0.2949	1.0895
250	75th-90th	{-0.17,0.16}	{-0.21,0.22}	{-0.23,0.26}	0.0099	1.0498	0.1271	1.0403
1,000	75th-90th	{-0.082,0.077}	{-0.11,0.1}	{-0.12,0.13}	0.0049	1.0259	0.0625	1.0225
5,000	75th-90th	{-0.037,0.035}	{-0.047,0.046}	{-0.055,0.056}	0.0027	1.0122	0.0285	1.0108
1	90th-100th	{-2.83,2.99}	{-3.4,5.63}	{-3.95,8.61}	0.9567	2.9351	3.7885	2.5688
2	90th-100th	{-1.98,2.12}	{-2.29,3.67}	{-2.62,5.59}	0.5660	2.3278	2.3732	2.0673
5	90th-100th	{-1.25,1.29}	{-1.41,2.12}	{-1.57,3.15}	0.2983	1.7885	1.2923	1.6427
25	90th-100th	{-0.57,0.49}	{-0.66,0.77}	{-0.74,1.06}	0.1702	1.3368	0.4877	1.2624
50	90th-100th	{-0.42,0.38}	{-0.51,0.55}	{-0.59,0.72}	0.3085	1.2694	0.4142	1.2251
250	90th-100th	{-0.2,0.15}	{-0.25,0.21}	{-0.3,0.27}	0.2283	1.1466	0.2223	1.1164
1,000	90th-100th	{-0.11,0.072}	{-0.13,0.1}	{-0.16,0.13}	0.1827	1.0998	0.1606	1.0803
5,000	90th-100th	{-0.054,0.03}	{-0.069,0.044}	{-0.089,0.055}	0.1008	1.0676	0.0848	1.0562

Lag: HCC Using CY2006-7 Less CY07 Q3 & Q4

Accuracy Metrics

Group Size	R-Square	MAPE
1	9.0%	0.9787
2	9.5%	0.8047
5	9.8%	0.5858
25	13.1%	0.2934
50	14.4%	0.2152
250	29.7%	0.1001
1,000	41.0%	0.0501
5,000	62.8%	0.0235

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.19,1.38}	{-1.64,2.89}	{-2.15,4.72}	0.8159	0.9987	2.0608	0.9987
2	All	{-0.99,1.27}	{-1.28,2.28}	{-1.58,3.41}	0.5822	0.9992	1.4547	0.9977
5	All	{-0.75,0.96}	{-0.92,1.54}	{-1.08,2.2}	0.3800	1.0005	0.9297	1.0017
25	All	{-0.42,0.49}	{-0.51,0.71}	{-0.58,0.96}	0.2029	1.0013	0.4238	0.9988
50	All	{-0.32,0.36}	{-0.39,0.5}	{-0.45,0.66}	0.1511	0.9979	0.3030	0.9973
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.22,0.27}	0.1042	0.9996	0.1507	1.0001
1,000	All	{-0.078,0.081}	{-0.1,0.11}	{-0.12,0.13}	0.0695	0.9994	0.0827	0.9998
5,000	All	{-0.037,0.037}	{-0.047,0.048}	{-0.057,0.058}	0.0518	0.9999	0.0496	1.0000
1	0-75th	{-0.73,1.11}	{-0.86,2.35}	{-0.96,3.92}	0.2697	0.6331	1.5267	0.7109
2	0-75th	{-0.71,1.13}	{-0.83,2.02}	{-0.92,2.99}	0.2495	0.7320	1.1488	0.7866
5	0-75th	{-0.62,0.91}	{-0.72,1.43}	{-0.79,2.01}	0.1998	0.8293	0.7983	0.8679
25	0-75th	{-0.38,0.48}	{-0.46,0.69}	{-0.52,0.93}	0.1174	0.9223	0.3840	0.9350
50	0-75th	{-0.29,0.36}	{-0.36,0.5}	{-0.41,0.66}	0.0965	0.9420	0.2804	0.9530
250	0-75th	{-0.14,0.17}	{-0.18,0.22}	{-0.21,0.27}	0.0647	0.9710	0.1325	0.9775
1,000	0-75th	{-0.073,0.084}	{-0.093,0.11}	{-0.11,0.13}	0.0423	0.9816	0.0707	0.9857
5,000	0-75th	{-0.033,0.038}	{-0.044,0.049}	{-0.051,0.059}	0.0283	0.9881	0.0367	0.9906
1	75th-90th	{-1.47,2.04}	{-1.59,3.8}	{-1.69,5.76}	0.2095	1.5498	2.3406	1.4504
2	75th-90th	{-1.25,1.6}	{-1.36,2.73}	{-1.44,4.08}	0.1446	1.4610	1.6392	1.3694
5	75th-90th	{-0.95,1.1}	{-1.05,1.77}	{-1.12,2.5}	0.0844	1.3258	1.0051	1.2584
25	75th-90th	{-0.49,0.52}	{-0.57,0.77}	{-0.64,1.04}	0.0329	1.1525	0.4291	1.1231
50	75th-90th	{-0.36,0.35}	{-0.43,0.5}	{-0.48,0.65}	0.0223	1.1089	0.2922	1.0839
250	75th-90th	{-0.17,0.17}	{-0.2,0.23}	{-0.24,0.29}	0.0099	1.0497	0.1321	1.0406
1,000	75th-90th	{-0.083,0.074}	{-0.1,0.099}	{-0.12,0.12}	0.0051	1.0251	0.0627	1.0199
5,000	75th-90th	{-0.038,0.033}	{-0.048,0.045}	{-0.057,0.056}	0.0023	1.0119	0.0283	1.0094
1	90th-100th	{-2.85,2.88}	{-3.41,5.45}	{-3.98,8.4}	0.9499	2.9170	3.6945	2.4809
2	90th-100th	{-2,2.09}	{-2.31,3.62}	{-2.63,5.47}	0.5625	2.3102	2.3745	2.0240
5	90th-100th	{-1.28,1.22}	{-1.44,2.13}	{-1.59,3.12}	0.3489	1.7968	1.3167	1.6202
25	90th-100th	{-0.59,0.52}	{-0.7,0.79}	{-0.8,1.1}	0.3032	1.3671	0.5240	1.2907
50	90th-100th	{-0.42,0.37}	{-0.49,0.55}	{-0.56,0.72}	0.2278	1.2509	0.3650	1.1999
250	90th-100th	{-0.2,0.14}	{-0.24,0.2}	{-0.29,0.26}	0.2190	1.1383	0.2265	1.1089
1,000	90th-100th	{-0.1,0.07}	{-0.14,0.097}	{-0.17,0.12}	0.1498	1.0945	0.1312	1.0753
5,000	90th-100th	{-0.057,0.03}	{-0.08,0.041}	{-0.11,0.052}	0.1203	1.0710	0.0966	1.0561

Eligibility: HCC Using CY2007 Q2-4; 9 Months

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.3%	0.9603
2	12.3%	0.7901
5	12.9%	0.5721
25	19.5%	0.2900
50	18.2%	0.2080
250	34.7%	0.0972
1,000	50.4%	0.0493
5,000	69.7%	0.0223

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.15,1.36}	{-1.57,2.82}	{-2.04,4.61}	0.8112	1.0027	2.0578	1.0011
2	All	{-0.96,1.24}	{-1.23,2.22}	{-1.51,3.37}	0.5789	1.0009	1.4591	1.0010
5	All	{-0.73,0.93}	{-0.88,1.5}	{-1.03,2.16}	0.3705	0.9977	0.9309	1.0003
25	All	{-0.42,0.48}	{-0.5,0.7}	{-0.57,0.95}	0.2153	1.0046	0.4322	1.0028
50	All	{-0.3,0.35}	{-0.37,0.51}	{-0.42,0.67}	0.1440	0.9993	0.3022	1.0023
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.22,0.27}	0.1003	0.9986	0.1527	1.0005
1,000	All	{-0.077,0.081}	{-0.098,0.11}	{-0.12,0.13}	0.0706	1.0000	0.0879	1.0003
5,000	All	{-0.035,0.036}	{-0.045,0.047}	{-0.053,0.056}	0.0477	0.9988	0.0508	0.9990
1	0-75th	{-0.74,1.01}	{-0.86,2.19}	{-0.96,3.65}	0.2681	0.6399	1.4417	0.6808
2	0-75th	{-0.71,1.06}	{-0.82,1.9}	{-0.91,2.85}	0.2457	0.7355	1.1113	0.7653
5	0-75th	{-0.61,0.85}	{-0.71,1.36}	{-0.78,1.9}	0.1965	0.8286	0.7686	0.8468
25	0-75th	{-0.38,0.46}	{-0.45,0.67}	{-0.51,0.89}	0.1142	0.9241	0.3764	0.9305
50	0-75th	{-0.29,0.35}	{-0.35,0.49}	{-0.39,0.64}	0.0949	0.9439	0.2751	0.9522
250	0-75th	{-0.14,0.16}	{-0.18,0.22}	{-0.21,0.27}	0.0640	0.9710	0.1341	0.9757
1,000	0-75th	{-0.073,0.082}	{-0.095,0.11}	{-0.11,0.13}	0.0413	0.9826	0.0707	0.9848
5,000	0-75th	{-0.034,0.037}	{-0.044,0.047}	{-0.052,0.057}	0.0279	0.9878	0.0368	0.9891
1	75th-90th	{-1.45,2.09}	{-1.57,3.79}	{-1.67,5.77}	0.2043	1.5473	2.3010	1.4655
2	75th-90th	{-1.23,1.64}	{-1.34,2.76}	{-1.42,4.04}	0.1456	1.4565	1.6444	1.3946
5	75th-90th	{-0.92,1.13}	{-1.02,1.79}	{-1.09,2.6}	0.0842	1.3184	1.0372	1.2914
25	75th-90th	{-0.48,0.53}	{-0.56,0.76}	{-0.62,1.08}	0.0335	1.1551	0.4267	1.1374
50	75th-90th	{-0.34,0.37}	{-0.42,0.54}	{-0.47,0.71}	0.0235	1.1104	0.2939	1.1009
250	75th-90th	{-0.16,0.16}	{-0.2,0.22}	{-0.23,0.29}	0.0097	1.0489	0.1264	1.0450
1,000	75th-90th	{-0.08,0.078}	{-0.1,0.1}	{-0.11,0.13}	0.0050	1.0255	0.0618	1.0242
5,000	75th-90th	{-0.035,0.034}	{-0.045,0.045}	{-0.051,0.056}	0.0024	1.0116	0.0273	1.0111
1	90th-100th	{-2.7,3.32}	{-3.2,5.93}	{-3.76,9.14}	0.9536	2.9090	3.8483	2.7084
2	90th-100th	{-1.89,2.29}	{-2.19,3.97}	{-2.5,5.83}	0.5641	2.3080	2.4363	2.1788
5	90th-100th	{-1.22,1.4}	{-1.37,2.29}	{-1.52,3.32}	0.2919	1.7840	1.3438	1.7144
25	90th-100th	{-0.56,0.57}	{-0.66,0.91}	{-0.77,1.2}	0.3728	1.3822	0.5919	1.3427
50	90th-100th	{-0.37,0.4}	{-0.44,0.61}	{-0.5,0.75}	0.1887	1.2478	0.3613	1.2305
250	90th-100th	{-0.17,0.16}	{-0.22,0.23}	{-0.24,0.27}	0.2068	1.1309	0.2296	1.1191
1,000	90th-100th	{-0.095,0.076}	{-0.12,0.1}	{-0.15,0.13}	0.1589	1.0922	0.1575	1.0814
5,000	90th-100th	{-0.045,0.032}	{-0.058,0.046}	{-0.069,0.053}	0.1084	1.0622	0.1022	1.0550

Eligibility: HCC Using CY2007 Q3-4; 6 Months

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.2%	0.9655
2	12.2%	0.7908
5	12.7%	0.5725
25	15.6%	0.2865
50	23.4%	0.2095
250	40.3%	0.0973
1,000	50.2%	0.0489
5,000	74.4%	0.0220

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.13,1.37}	{-1.53,2.84}	{-1.97,4.65}	0.7877	1.0027	2.0675	1.0033
2	All	{-0.94,1.26}	{-1.2,2.24}	{-1.47,3.37}	0.5585	1.0018	1.4450	0.9996
5	All	{-0.72,0.94}	{-0.88,1.5}	{-1.02,2.15}	0.3576	0.9983	0.9286	0.9997
25	All	{-0.41,0.47}	{-0.49,0.69}	{-0.56,0.95}	0.1764	0.9984	0.4174	0.9979
50	All	{-0.31,0.35}	{-0.38,0.5}	{-0.43,0.66}	0.1650	1.0014	0.3123	0.9997
250	All	{-0.15,0.16}	{-0.19,0.21}	{-0.22,0.26}	0.1103	1.0001	0.1591	0.9989
1,000	All	{-0.077,0.079}	{-0.097,0.1}	{-0.11,0.13}	0.0689	0.9998	0.0872	0.9999
5,000	All	{-0.035,0.036}	{-0.045,0.046}	{-0.055,0.056}	0.0509	0.9998	0.0547	0.9998
1	0-75th	{-0.75,1.02}	{-0.87,2.22}	{-0.96,3.71}	0.2570	0.6535	1.4615	0.6875
2	0-75th	{-0.71,1.07}	{-0.82,1.92}	{-0.91,2.87}	0.2345	0.7466	1.1183	0.7696
5	0-75th	{-0.62,0.85}	{-0.71,1.36}	{-0.79,1.92}	0.1884	0.8356	0.7746	0.8494
25	0-75th	{-0.38,0.45}	{-0.45,0.65}	{-0.51,0.88}	0.1110	0.9250	0.3744	0.9286
50	0-75th	{-0.29,0.34}	{-0.36,0.49}	{-0.4,0.63}	0.0917	0.9454	0.2754	0.9491
250	0-75th	{-0.15,0.16}	{-0.18,0.21}	{-0.21,0.26}	0.0586	0.9721	0.1320	0.9727
1,000	0-75th	{-0.074,0.08}	{-0.093,0.1}	{-0.11,0.13}	0.0401	0.9829	0.0704	0.9845
5,000	0-75th	{-0.034,0.036}	{-0.043,0.046}	{-0.052,0.056}	0.0262	0.9885	0.0365	0.9892
1	75th-90th	{-1.42,2.07}	{-1.54,3.76}	{-1.63,5.76}	0.1961	1.5188	2.3073	1.4543
2	75th-90th	{-1.2,1.64}	{-1.31,2.76}	{-1.38,4.01}	0.1398	1.4314	1.6417	1.3801
5	75th-90th	{-0.91,1.15}	{-1.01,1.78}	{-1.08,2.5}	0.0802	1.3057	1.0192	1.2804
25	75th-90th	{-0.46,0.52}	{-0.55,0.75}	{-0.62,1.05}	0.0322	1.1464	0.4189	1.1360
50	75th-90th	{-0.34,0.36}	{-0.42,0.51}	{-0.47,0.7}	0.0225	1.1054	0.2913	1.0912
250	75th-90th	{-0.16,0.16}	{-0.19,0.22}	{-0.22,0.27}	0.0094	1.0472	0.1263	1.0453
1,000	75th-90th	{-0.082,0.079}	{-0.1,0.1}	{-0.12,0.12}	0.0046	1.0243	0.0623	1.0223
5,000	75th-90th	{-0.036,0.034}	{-0.045,0.044}	{-0.054,0.057}	0.0023	1.0112	0.0273	1.0108
1	90th-100th	{-2.63,3.36}	{-3.13,5.95}	{-3.65,9.17}	0.9624	2.8487	3.8500	2.6954
2	90th-100th	{-1.84,2.28}	{-2.13,3.86}	{-2.42,5.65}	0.5513	2.2693	2.3469	2.1523
5	90th-100th	{-1.19,1.36}	{-1.34,2.25}	{-1.48,3.34}	0.2921	1.7581	1.3334	1.7068
25	90th-100th	{-0.53,0.59}	{-0.63,0.91}	{-0.7,1.25}	0.1886	1.3275	0.5148	1.3108
50	90th-100th	{-0.39,0.4}	{-0.45,0.6}	{-0.53,0.75}	0.3149	1.2653	0.4344	1.2418
250	90th-100th	{-0.17,0.16}	{-0.22,0.22}	{-0.25,0.26}	0.2588	1.1397	0.2724	1.1255
1,000	90th-100th	{-0.094,0.079}	{-0.12,0.1}	{-0.14,0.13}	0.1559	1.0898	0.1543	1.0816
5,000	90th-100th	{-0.043,0.034}	{-0.055,0.044}	{-0.063,0.052}	0.1224	1.0682	0.1178	1.0626

Eligibility: HCC Using CY2007 Q4; 3 Months

Accuracy Metrics

Group Size	R-Square	MAPE
1	11.8%	0.9750
2	11.7%	0.7971
5	12.0%	0.5757
25	15.0%	0.2894
50	17.7%	0.2085
250	38.5%	0.0981
1,000	53.3%	0.0496
5,000	72.7%	0.0225

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.1,1.39}	{-1.46,2.88}	{-1.85,4.68}	0.7369	1.0021	2.0743	1.0025
2	All	{-0.93,1.26}	{-1.16,2.25}	{-1.41,3.4}	0.5220	1.0004	1.4552	0.9998
5	All	{-0.72,0.95}	{-0.86,1.52}	{-0.99,2.16}	0.3338	0.9978	0.9251	0.9989
25	All	{-0.41,0.48}	{-0.49,0.71}	{-0.56,0.95}	0.1646	0.9987	0.4219	1.0005
50	All	{-0.31,0.35}	{-0.37,0.5}	{-0.43,0.65}	0.1374	0.9989	0.2990	0.9971
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.22,0.27}	0.1018	1.0003	0.1578	1.0005
1,000	All	{-0.078,0.082}	{-0.099,0.11}	{-0.12,0.13}	0.0686	0.9998	0.0911	1.0006
5,000	All	{-0.036,0.036}	{-0.046,0.047}	{-0.054,0.056}	0.0481	1.0001	0.0541	1.0001
1	0-75th	{-0.77,1.04}	{-0.88,2.24}	{-0.97,3.75}	0.2398	0.6799	1.4760	0.6956
2	0-75th	{-0.72,1.07}	{-0.83,1.93}	{-0.91,2.87}	0.2174	0.7641	1.1324	0.7753
5	0-75th	{-0.62,0.86}	{-0.71,1.36}	{-0.78,1.92}	0.1724	0.8458	0.7748	0.8535
25	0-75th	{-0.39,0.45}	{-0.46,0.67}	{-0.52,0.9}	0.1042	0.9297	0.3788	0.9307
50	0-75th	{-0.3,0.34}	{-0.36,0.48}	{-0.4,0.63}	0.0849	0.9483	0.2734	0.9497
250	0-75th	{-0.15,0.16}	{-0.18,0.21}	{-0.21,0.26}	0.0550	0.9739	0.1308	0.9748
1,000	0-75th	{-0.076,0.083}	{-0.097,0.11}	{-0.11,0.13}	0.0371	0.9840	0.0712	0.9855
5,000	0-75th	{-0.035,0.036}	{-0.044,0.047}	{-0.052,0.056}	0.0242	0.9896	0.0357	0.9902
1	75th-90th	{-1.37,2.03}	{-1.49,3.76}	{-1.58,5.67}	0.1826	1.4699	2.2889	1.4218
2	75th-90th	{-1.17,1.64}	{-1.26,2.77}	{-1.34,4.04}	0.1273	1.3905	1.6463	1.3623
5	75th-90th	{-0.9,1.13}	{-0.99,1.78}	{-1.06,2.54}	0.0768	1.2823	1.0193	1.2635
25	75th-90th	{-0.46,0.54}	{-0.55,0.82}	{-0.61,1.1}	0.0303	1.1367	0.4365	1.1381
50	75th-90th	{-0.34,0.36}	{-0.41,0.52}	{-0.46,0.67}	0.0210	1.0977	0.2856	1.0876
250	75th-90th	{-0.15,0.17}	{-0.19,0.23}	{-0.22,0.28}	0.0090	1.0440	0.1293	1.0457
1,000	75th-90th	{-0.078,0.082}	{-0.098,0.1}	{-0.12,0.12}	0.0044	1.0226	0.0618	1.0230
5,000	75th-90th	{-0.037,0.037}	{-0.046,0.047}	{-0.053,0.058}	0.0020	1.0104	0.0283	1.0096
1	90th-100th	{-2.46,3.43}	{-3,6.08}	{-3.5,9.15}	0.9524	2.7167	3.8821	2.6751
2	90th-100th	{-1.77,2.39}	{-2.05,3.91}	{-2.31,5.74}	0.5399	2.1868	2.3706	2.1387
5	90th-100th	{-1.15,1.44}	{-1.3,2.32}	{-1.44,3.4}	0.2831	1.7103	1.3238	1.6927
25	90th-100th	{-0.5,0.58}	{-0.6,0.84}	{-0.68,1.22}	0.1653	1.3091	0.5028	1.3176
50	90th-100th	{-0.36,0.39}	{-0.44,0.55}	{-0.49,0.72}	0.2164	1.2304	0.3661	1.2163
250	90th-100th	{-0.17,0.16}	{-0.21,0.22}	{-0.24,0.28}	0.2351	1.1327	0.2688	1.1248
1,000	90th-100th	{-0.088,0.079}	{-0.11,0.11}	{-0.13,0.13}	0.1643	1.0835	0.1747	1.0799
5,000	90th-100th	{-0.041,0.037}	{-0.053,0.044}	{-0.065,0.055}	0.1175	1.0634	0.1185	1.0605

Turnover: HCC Using CY2007 (10% New Mbrs)

Accuracy Metrics

Group Size	R-Square	MAPE
1	11.3%	0.9666
2	11.1%	0.7973
5	11.7%	0.5789
25	13.2%	0.2915
50	24.6%	0.2117
250	43.2%	0.0976
1,000	36.6%	0.0496
5,000	69.9%	0.0220

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.12,1.36}	{-1.52,2.84}	{-2,4.64}	0.7868	0.9984	2.0609	0.9976
2	All	{-0.95,1.26}	{-1.22,2.25}	{-1.5,3.37}	0.5622	1.0003	1.4568	0.9993
5	All	{-0.73,0.94}	{-0.89,1.51}	{-1.04,2.17}	0.3662	0.9993	0.9383	1.0003
25	All	{-0.42,0.48}	{-0.5,0.71}	{-0.57,0.95}	0.1759	0.9973	0.4199	0.9966
50	All	{-0.31,0.35}	{-0.38,0.5}	{-0.44,0.64}	0.1791	1.0020	0.3171	0.9991
250	All	{-0.15,0.16}	{-0.19,0.21}	{-0.22,0.27}	0.1166	1.0015	0.1638	1.0010
1,000	All	{-0.077,0.082}	{-0.099,0.11}	{-0.12,0.13}	0.0548	0.9994	0.0784	0.9999
5,000	All	{-0.035,0.035}	{-0.044,0.046}	{-0.054,0.055}	0.0483	0.9998	0.0505	0.9993
1	0-75th	{-0.78,1.05}	{-0.9,2.26}	{-0.98,3.78}	0.2751	0.6571	1.4904	0.7004
2	0-75th	{-0.72,1.09}	{-0.82,1.95}	{-0.91,2.92}	0.2375	0.7440	1.1395	0.7774
5	0-75th	{-0.62,0.87}	{-0.71,1.37}	{-0.79,1.94}	0.1896	0.8336	0.7828	0.8527
25	0-75th	{-0.39,0.47}	{-0.46,0.68}	{-0.51,0.9}	0.1143	0.9237	0.3811	0.9323
50	0-75th	{-0.29,0.34}	{-0.36,0.48}	{-0.41,0.63}	0.0934	0.9451	0.2780	0.9502
250	0-75th	{-0.15,0.16}	{-0.18,0.21}	{-0.21,0.27}	0.0607	0.9729	0.1323	0.9754
1,000	0-75th	{-0.074,0.083}	{-0.095,0.11}	{-0.11,0.13}	0.0322	0.9832	0.0673	0.9857
5,000	0-75th	{-0.034,0.036}	{-0.043,0.047}	{-0.051,0.056}	0.0249	0.9888	0.0342	0.9895
1	75th-90th	{-1.38,1.99}	{-1.51,3.64}	{-1.61,5.5}	0.2062	1.4731	2.2162	1.3920
2	75th-90th	{-1.21,1.6}	{-1.32,2.71}	{-1.4,3.96}	0.1434	1.4310	1.6452	1.3654
5	75th-90th	{-0.93,1.12}	{-1.02,1.77}	{-1.09,2.55}	0.0829	1.3081	1.0453	1.2716
25	75th-90th	{-0.48,0.53}	{-0.57,0.77}	{-0.63,1.08}	0.0319	1.1466	0.4366	1.1300
50	75th-90th	{-0.35,0.35}	{-0.43,0.5}	{-0.48,0.65}	0.0221	1.1064	0.2916	1.0851
250	75th-90th	{-0.16,0.16}	{-0.2,0.22}	{-0.23,0.27}	0.0096	1.0485	0.1282	1.0439
1,000	75th-90th	{-0.082,0.08}	{-0.1,0.1}	{-0.12,0.13}	0.0050	1.0250	0.0630	1.0226
5,000	75th-90th	{-0.037,0.035}	{-0.047,0.045}	{-0.057,0.054}	0.0024	1.0114	0.0278	1.0097
1	90th-100th	{-2.67,3.21}	{-3.19,5.84}	{-3.75,9.09}	0.9661	2.8451	3.8549	2.6343
2	90th-100th	{-1.9,2.24}	{-2.18,3.78}	{-2.49,5.69}	0.5547	2.2769	2.3690	2.1150
5	90th-100th	{-1.22,1.39}	{-1.39,2.24}	{-1.56,3.28}	0.3235	1.7790	1.3438	1.7005
25	90th-100th	{-0.56,0.56}	{-0.65,0.84}	{-0.74,1.13}	0.1689	1.3251	0.4999	1.2793
50	90th-100th	{-0.39,0.38}	{-0.47,0.54}	{-0.54,0.67}	0.3750	1.2728	0.4616	1.2370
250	90th-100th	{-0.17,0.16}	{-0.22,0.22}	{-0.25,0.28}	0.2791	1.1459	0.2974	1.1291
1,000	90th-100th	{-0.093,0.076}	{-0.12,0.1}	{-0.14,0.13}	0.1113	1.0824	0.1181	1.0725
5,000	90th-100th	{-0.044,0.032}	{-0.054,0.042}	{-0.069,0.051}	0.1159	1.0644	0.1061	1.0578

Turnover: HCC Using CY2007 (30% New Mbrs)

Accuracy Metrics

Group Size	R-Square	MAPE
1	8.9%	0.9884
2	8.9%	0.8156
5	9.2%	0.5866
25	17.2%	0.2942
50	14.1%	0.2154
250	30.5%	0.0986
1,000	43.6%	0.0503
5,000	63.1%	0.0225

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.07,1.41}	{-1.37,2.91}	{-1.83,4.73}	0.6980	0.9991	2.0417	0.9942
2	All	{-0.93,1.29}	{-1.15,2.3}	{-1.41,3.46}	0.4961	1.0008	1.4673	1.0011
5	All	{-0.73,0.96}	{-0.87,1.55}	{-1,2.2}	0.3233	1.0007	0.9234	1.0004
25	All	{-0.42,0.49}	{-0.5,0.73}	{-0.57,0.97}	0.2013	1.0026	0.4342	0.9998
50	All	{-0.32,0.36}	{-0.38,0.52}	{-0.44,0.67}	0.1332	0.9987	0.3025	0.9997
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.22,0.27}	0.0950	0.9995	0.1497	0.9997
1,000	All	{-0.078,0.084}	{-0.099,0.11}	{-0.12,0.13}	0.0631	0.9998	0.0840	1.0004
5,000	All	{-0.036,0.038}	{-0.045,0.048}	{-0.055,0.057}	0.0432	0.9999	0.0468	1.0003
1	0-75th	{-0.84,1.13}	{-0.94,2.42}	{-1.01,4.03}	0.2716	0.7158	1.6338	0.7481
2	0-75th	{-0.75,1.14}	{-0.84,2.05}	{-0.91,3.09}	0.2104	0.7823	1.2028	0.8094
5	0-75th	{-0.64,0.9}	{-0.72,1.43}	{-0.79,2.02}	0.1628	0.8556	0.8073	0.8732
25	0-75th	{-0.39,0.48}	{-0.47,0.7}	{-0.52,0.92}	0.0982	0.9335	0.3851	0.9379
50	0-75th	{-0.3,0.36}	{-0.36,0.52}	{-0.41,0.66}	0.0827	0.9514	0.2816	0.9585
250	0-75th	{-0.15,0.16}	{-0.18,0.22}	{-0.21,0.26}	0.0557	0.9750	0.1315	0.9774
1,000	0-75th	{-0.076,0.084}	{-0.096,0.11}	{-0.11,0.13}	0.0353	0.9853	0.0692	0.9874
5,000	0-75th	{-0.034,0.038}	{-0.043,0.049}	{-0.052,0.058}	0.0237	0.9906	0.0345	0.9922
1	75th-90th	{-1.22,1.91}	{-1.33,3.54}	{-1.42,5.35}	0.1566	1.3171	2.1195	1.2744
2	75th-90th	{-1.14,1.56}	{-1.23,2.61}	{-1.31,3.84}	0.1289	1.3378	1.5551	1.2815
5	75th-90th	{-0.9,1.08}	{-0.99,1.74}	{-1.05,2.49}	0.0737	1.2629	0.9938	1.2246
25	75th-90th	{-0.47,0.52}	{-0.56,0.76}	{-0.62,1.06}	0.0287	1.1298	0.4240	1.1126
50	75th-90th	{-0.34,0.37}	{-0.42,0.55}	{-0.47,0.72}	0.0195	1.0922	0.2972	1.0809
250	75th-90th	{-0.16,0.17}	{-0.19,0.23}	{-0.23,0.28}	0.0085	1.0423	0.1282	1.0405
1,000	75th-90th	{-0.081,0.082}	{-0.11,0.11}	{-0.12,0.13}	0.0043	1.0220	0.0640	1.0206
5,000	75th-90th	{-0.037,0.036}	{-0.046,0.047}	{-0.054,0.059}	0.0021	1.0104	0.0284	1.0096
1	90th-100th	{-2.5,2.96}	{-3.02,5.39}	{-3.58,8.24}	0.9505	2.6185	3.5071	2.3953
2	90th-100th	{-1.78,2.19}	{-2.07,3.72}	{-2.35,5.64}	0.5394	2.1344	2.3716	2.0179
5	90th-100th	{-1.17,1.37}	{-1.32,2.15}	{-1.47,3.11}	0.3057	1.6963	1.2562	1.6183
25	90th-100th	{-0.54,0.56}	{-0.64,0.87}	{-0.71,1.14}	0.4055	1.3302	0.6069	1.2947
50	90th-100th	{-0.38,0.37}	{-0.45,0.55}	{-0.53,0.7}	0.2229	1.2131	0.3612	1.1862
250	90th-100th	{-0.18,0.16}	{-0.22,0.22}	{-0.26,0.28}	0.2129	1.1195	0.2293	1.1050
1,000	90th-100th	{-0.095,0.081}	{-0.11,0.11}	{-0.14,0.13}	0.1497	1.0754	0.1488	1.0679
5,000	90th-100th	{-0.048,0.033}	{-0.06,0.044}	{-0.071,0.054}	0.1033	1.0541	0.0949	1.0470

Data Quality: HCC Using CY2007 (Ignore Inpatient Dx)

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.00%	0.9570
2	12.2%	0.7864
5	13.2%	0.5705
25	20.1%	0.2886
50	21.3%	0.2077
250	39.7%	0.0973
1,000	54.3%	0.0494
5,000	69.2%	0.0225

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.16,1.35}	{-1.6,2.81}	{-2.09,4.62}	0.8231	0.9997	2.0589	1.0000
2	All	{-0.96,1.24}	{-1.24,2.22}	{-1.53,3.34}	0.5807	0.9968	1.4470	0.9958
5	All	{-0.73,0.93}	{-0.89,1.49}	{-1.05,2.15}	0.3878	1.0007	0.9241	1.0010
25	All	{-0.41,0.48}	{-0.49,0.7}	{-0.56,0.95}	0.2301	1.0025	0.4362	1.0011
50	All	{-0.31,0.34}	{-0.37,0.49}	{-0.43,0.64}	0.1640	1.0014	0.3046	0.9971
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.22,0.27}	0.1131	1.0001	0.1587	0.9994
1,000	All	{-0.078,0.08}	{-0.099,0.1}	{-0.12,0.13}	0.0775	1.0003	0.0922	1.0000
5,000	All	{-0.036,0.036}	{-0.046,0.046}	{-0.055,0.055}	0.0488	0.9999	0.0510	0.9996
1	0-75th	{-0.73,1.02}	{-0.86,2.2}	{-0.96,3.65}	0.2745	0.6290	1.4430	0.6806
2	0-75th	{-0.7,1.06}	{-0.82,1.9}	{-0.91,2.84}	0.2519	0.7289	1.1065	0.7621
5	0-75th	{-0.61,0.85}	{-0.71,1.35}	{-0.79,1.89}	0.2028	0.8269	0.7661	0.8478
25	0-75th	{-0.38,0.46}	{-0.45,0.67}	{-0.51,0.9}	0.1205	0.9208	0.3799	0.9288
50	0-75th	{-0.29,0.34}	{-0.35,0.47}	{-0.4,0.63}	0.0955	0.9432	0.2720	0.9469
250	0-75th	{-0.14,0.16}	{-0.18,0.21}	{-0.21,0.26}	0.0660	0.9707	0.1335	0.9728
1,000	0-75th	{-0.076,0.081}	{-0.096,0.1}	{-0.11,0.13}	0.0431	0.9818	0.0715	0.9834
5,000	0-75th	{-0.034,0.037}	{-0.043,0.047}	{-0.052,0.056}	0.0277	0.9883	0.0364	0.9896
1	75th-90th	{-1.46,2.05}	{-1.6,3.74}	{-1.7,5.68}	0.2161	1.5602	2.3226	1.4691
2	75th-90th	{-1.24,1.63}	{-1.35,2.76}	{-1.44,4.04}	0.1472	1.4656	1.6148	1.3876
5	75th-90th	{-0.93,1.11}	{-1.03,1.76}	{-1.1,2.53}	0.0844	1.3286	1.0104	1.2810
25	75th-90th	{-0.47,0.53}	{-0.56,0.75}	{-0.63,1.03}	0.0338	1.1569	0.4288	1.1408
50	75th-90th	{-0.35,0.35}	{-0.4,0.5}	{-0.46,0.64}	0.0231	1.1108	0.2831	1.0890
250	75th-90th	{-0.16,0.17}	{-0.2,0.22}	{-0.23,0.28}	0.0098	1.0503	0.1296	1.0474
1,000	75th-90th	{-0.082,0.08}	{-0.1,0.11}	{-0.12,0.13}	0.0051	1.0258	0.0639	1.0236
5,000	75th-90th	{-0.038,0.033}	{-0.047,0.045}	{-0.054,0.053}	0.0025	1.0120	0.0278	1.0098
1	90th-100th	{-2.75,3.29}	{-3.26,5.96}	{-3.8,8.96}	0.9387	2.9374	3.8369	2.6898
2	90th-100th	{-1.9,2.28}	{-2.2,3.9}	{-2.5,5.86}	0.5358	2.3045	2.4180	2.1621
5	90th-100th	{-1.23,1.42}	{-1.4,2.29}	{-1.56,3.24}	0.3712	1.8125	1.3349	1.7298
25	90th-100th	{-0.55,0.57}	{-0.66,0.86}	{-0.74,1.19}	0.4331	1.3838	0.6044	1.3334
50	90th-100th	{-0.4,0.37}	{-0.48,0.54}	{-0.54,0.71}	0.2873	1.2730	0.4048	1.2361
250	90th-100th	{-0.18,0.16}	{-0.22,0.22}	{-0.27,0.26}	0.2527	1.1450	0.2611	1.1271
1,000	90th-100th	{-0.096,0.075}	{-0.12,0.1}	{-0.15,0.13}	0.1799	1.1009	0.1729	1.0887
5,000	90th-100th	{-0.05,0.03}	{-0.066,0.04}	{-0.073,0.051}	0.1102	1.0687	0.1028	1.0585

Data Quality: HCC Using CY2007 (Ignore Outpatient Dx)

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.3%	0.9595
2	12.3%	0.7885
5	13.4%	0.5746
25	16.1%	0.2884
50	24.2%	0.2104
250	33.4%	0.0964
1,000	55.5%	0.0491
5,000	68.4%	0.0224

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.16,1.35}	{-1.6,2.82}	{-2.09,4.62}	0.8281	1.0020	2.0778	1.0042
2	All	{-0.96,1.24}	{-1.24,2.22}	{-1.53,3.35}	0.5868	0.9968	1.4708	0.9996
5	All	{-0.73,0.94}	{-0.9,1.49}	{-1.05,2.12}	0.3898	1.0013	0.9429	1.0040
25	All	{-0.41,0.47}	{-0.5,0.71}	{-0.57,0.96}	0.1992	1.0003	0.4232	0.9984
50	All	{-0.31,0.35}	{-0.38,0.5}	{-0.43,0.65}	0.1787	1.0034	0.3158	1.0034
250	All	{-0.15,0.16}	{-0.18,0.21}	{-0.21,0.26}	0.0993	0.9978	0.1496	0.9977
1,000	All	{-0.078,0.078}	{-0.098,0.1}	{-0.12,0.13}	0.0797	1.0003	0.0925	0.9992
5,000	All	{-0.035,0.037}	{-0.046,0.047}	{-0.053,0.057}	0.0474	0.9988	0.0500	0.9989
1	0-75th	{-0.73,1.02}	{-0.85,2.2}	{-0.96,3.66}	0.2719	0.6306	1.4419	0.6811
2	0-75th	{-0.7,1.06}	{-0.82,1.91}	{-0.91,2.85}	0.2506	0.7268	1.1191	0.7642
5	0-75th	{-0.61,0.86}	{-0.71,1.35}	{-0.79,1.88}	0.2023	0.8275	0.7769	0.8502
25	0-75th	{-0.38,0.46}	{-0.45,0.68}	{-0.51,0.92}	0.1186	0.9204	0.3808	0.9299
50	0-75th	{-0.29,0.34}	{-0.35,0.48}	{-0.4,0.61}	0.0955	0.9437	0.2738	0.9500
250	0-75th	{-0.14,0.16}	{-0.18,0.22}	{-0.2,0.26}	0.0672	0.9695	0.1332	0.9736
1,000	0-75th	{-0.075,0.08}	{-0.094,0.1}	{-0.11,0.13}	0.0419	0.9819	0.0708	0.9831
5,000	0-75th	{-0.034,0.038}	{-0.043,0.048}	{-0.051,0.057}	0.0285	0.9876	0.0370	0.9891
1	75th-90th	{-1.46,2.07}	{-1.6,3.78}	{-1.7,5.79}	0.2155	1.5610	2.3483	1.4759
2	75th-90th	{-1.24,1.63}	{-1.34,2.73}	{-1.43,3.99}	0.1475	1.4640	1.6597	1.3913
5	75th-90th	{-0.94,1.1}	{-1.03,1.76}	{-1.11,2.48}	0.0855	1.3296	1.0296	1.2840
25	75th-90th	{-0.47,0.51}	{-0.56,0.76}	{-0.63,1.04}	0.0340	1.1572	0.4182	1.1296
50	75th-90th	{-0.35,0.36}	{-0.42,0.52}	{-0.48,0.7}	0.0233	1.1134	0.2944	1.1013
250	75th-90th	{-0.16,0.15}	{-0.2,0.21}	{-0.23,0.26}	0.0098	1.0499	0.1260	1.0401
1,000	75th-90th	{-0.077,0.076}	{-0.099,0.1}	{-0.11,0.13}	0.0050	1.0258	0.0611	1.0228
5,000	75th-90th	{-0.036,0.035}	{-0.045,0.046}	{-0.055,0.056}	0.0024	1.0118	0.0276	1.0101
1	90th-100th	{-2.76,3.32}	{-3.28,6.01}	{-3.84,9.01}	0.9653	2.9526	3.9065	2.7233
2	90th-100th	{-1.91,2.26}	{-2.21,3.9}	{-2.52,5.83}	0.5577	2.3219	2.4651	2.1792
5	90th-100th	{-1.24,1.42}	{-1.41,2.33}	{-1.56,3.36}	0.3948	1.8119	1.3925	1.7371
25	90th-100th	{-0.57,0.54}	{-0.66,0.85}	{-0.73,1.15}	0.2694	1.3642	0.5292	1.3156
50	90th-100th	{-0.4,0.41}	{-0.48,0.6}	{-0.55,0.8}	0.3543	1.2859	0.4527	1.2577
250	90th-100th	{-0.18,0.16}	{-0.22,0.22}	{-0.25,0.26}	0.1915	1.1315	0.2146	1.1148
1,000	90th-100th	{-0.099,0.07}	{-0.12,0.093}	{-0.15,0.12}	0.1921	1.0997	0.1797	1.0845
5,000	90th-100th	{-0.047,0.031}	{-0.058,0.041}	{-0.07,0.05}	0.1047	1.0637	0.0972	1.0560

Data Quality: HCC Using CY2007 (Ignore Professional Dx)

Accuracy Metrics

Group Size	R-Square	MAPE
1	9.2%	0.9922
2	9.5%	0.8125
5	10.0%	0.5863
25	14.6%	0.2919
50	14.6%	0.2115
250	30.2%	0.0985
1,000	43.2%	0.0498
5,000	66.4%	0.0226

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.09,1.42}	{-1.43,2.93}	{-1.81,4.78}	0.6686	0.9994	2.0746	1.0008
2	All	{-0.92,1.29}	{-1.15,2.3}	{-1.39,3.47}	0.4793	1.0010	1.4570	1.0016
5	All	{-0.73,0.95}	{-0.86,1.54}	{-0.99,2.2}	0.3138	1.0019	0.9353	1.0010
25	All	{-0.42,0.48}	{-0.5,0.7}	{-0.56,0.95}	0.1760	1.0012	0.4214	0.9988
50	All	{-0.31,0.35}	{-0.38,0.51}	{-0.43,0.66}	0.1170	0.9984	0.2976	0.9976
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.22,0.27}	0.0885	0.9993	0.1491	0.9989
1,000	All	{-0.079,0.081}	{-0.098,0.11}	{-0.12,0.13}	0.0573	1.0008	0.0828	0.9999
5,000	All	{-0.036,0.036}	{-0.046,0.048}	{-0.055,0.058}	0.0423	1.0000	0.0491	1.0004
1	0-75th	{-0.78,1.08}	{-0.89,2.32}	{-0.96,3.89}	0.2180	0.7035	1.5302	0.7174
2	0-75th	{-0.74,1.11}	{-0.84,2}	{-0.91,2.99}	0.1984	0.7849	1.1607	0.7967
5	0-75th	{-0.64,0.87}	{-0.72,1.4}	{-0.79,1.98}	0.1580	0.8614	0.8020	0.8685
25	0-75th	{-0.39,0.46}	{-0.47,0.67}	{-0.53,0.9}	0.0944	0.9357	0.3805	0.9376
50	0-75th	{-0.3,0.34}	{-0.36,0.49}	{-0.41,0.65}	0.0791	0.9531	0.2778	0.9539
250	0-75th	{-0.15,0.16}	{-0.18,0.22}	{-0.21,0.27}	0.0530	0.9761	0.1314	0.9771
1,000	0-75th	{-0.078,0.08}	{-0.097,0.11}	{-0.12,0.13}	0.0300	0.9865	0.0678	0.9859
5,000	0-75th	{-0.035,0.037}	{-0.045,0.048}	{-0.054,0.057}	0.0228	0.9903	0.0348	0.9912
1	75th-90th	{-1.32,2.08}	{-1.43,3.79}	{-1.51,5.84}	0.1710	1.4053	2.3986	1.4035
2	75th-90th	{-1.16,1.69}	{-1.24,2.83}	{-1.32,4.11}	0.1161	1.3559	1.6488	1.3456
5	75th-90th	{-0.89,1.12}	{-0.99,1.77}	{-1.05,2.54}	0.0704	1.2596	1.0292	1.2468
25	75th-90th	{-0.46,0.52}	{-0.54,0.76}	{-0.61,1}	0.0277	1.1255	0.4181	1.1226
50	75th-90th	{-0.33,0.37}	{-0.4,0.51}	{-0.45,0.66}	0.0183	1.0898	0.2871	1.0843
250	75th-90th	{-0.16,0.17}	{-0.19,0.22}	{-0.23,0.27}	0.0078	1.0399	0.1274	1.0360
1,000	75th-90th	{-0.078,0.083}	{-0.099,0.11}	{-0.12,0.13}	0.0042	1.0214	0.0619	1.0206
5,000	75th-90th	{-0.036,0.034}	{-0.045,0.046}	{-0.054,0.057}	0.0020	1.0097	0.0279	1.0087
1	90th-100th	{-2.37,3.23}	{-2.87,5.77}	{-3.4,8.8}	0.8572	2.5568	3.6848	2.4705
2	90th-100th	{-1.73,2.24}	{-2.01,3.79}	{-2.28,5.71}	0.5054	2.0912	2.3485	2.0250
5	90th-100th	{-1.15,1.37}	{-1.29,2.21}	{-1.43,3.26}	0.3130	1.6680	1.3121	1.6253
25	90th-100th	{-0.55,0.56}	{-0.64,0.85}	{-0.72,1.18}	0.3054	1.3068	0.5493	1.2722
50	90th-100th	{-0.37,0.4}	{-0.45,0.57}	{-0.52,0.73}	0.1421	1.2013	0.3449	1.1950
250	90th-100th	{-0.17,0.17}	{-0.21,0.22}	{-0.26,0.29}	0.1950	1.1122	0.2261	1.1075
1,000	90th-100th	{-0.087,0.082}	{-0.11,0.11}	{-0.13,0.13}	0.1341	1.0772	0.1443	1.0741
5,000	90th-100th	{-0.042,0.037}	{-0.055,0.05}	{-0.064,0.065}	0.0992	1.0580	0.1000	1.0565

Baseline: Age/Gender Slope using CY2007 Allowed Cost

Accuracy Metrics

Group Size	R-Square	MAPE
1	0.5%	1.0817
2	0.5%	0.8746
5	0.5%	0.6212
25	0.7%	0.3091
50	1.0%	0.2262
250	2.3%	0.1034
1,000	4.1%	0.0525
5,000	9.9%	0.0235

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.02,1.6}	{-1.09,3.25}	{-1.13,5.16}	0.1466	1.0002	2.0738	1.0014
2	All	{-0.9,1.42}	{-0.97,2.48}	{-1.02,3.72}	0.1053	1.0006	1.4519	1.0002
5	All	{-0.75,1.03}	{-0.82,1.65}	{-0.87,2.36}	0.0685	1.0000	0.9225	1.0012
25	All	{-0.44,0.52}	{-0.52,0.76}	{-0.58,1.03}	0.0363	0.9999	0.4142	1.0016
50	All	{-0.33,0.38}	{-0.4,0.54}	{-0.45,0.69}	0.0293	1.0003	0.2944	0.9983
250	All	{-0.16,0.17}	{-0.2,0.23}	{-0.23,0.28}	0.0205	0.9999	0.1319	0.9981
1,000	All	{-0.082,0.085}	{-0.1,0.11}	{-0.12,0.14}	0.0139	1.0001	0.0674	0.9999
5,000	All	{-0.037,0.039}	{-0.047,0.05}	{-0.055,0.06}	0.0094	1.0000	0.0312	1.0004
1	0-75th	{-0.92,1.46}	{-0.99,3.12}	{-1.03,5.1}	0.1064	0.9277	2.0521	0.9299
2	0-75th	{-0.87,1.37}	{-0.92,2.44}	{-0.96,3.68}	0.0762	0.9550	1.4316	0.9550
5	0-75th	{-0.74,1.01}	{-0.8,1.63}	{-0.85,2.35}	0.0499	0.9710	0.9152	0.9721
25	0-75th	{-0.43,0.52}	{-0.51,0.76}	{-0.57,1.02}	0.0270	0.9860	0.4123	0.9898
50	0-75th	{-0.33,0.38}	{-0.4,0.55}	{-0.45,0.69}	0.0214	0.9900	0.2932	0.9881
250	0-75th	{-0.16,0.17}	{-0.2,0.23}	{-0.23,0.28}	0.0162	0.9945	0.1312	0.9928
1,000	0-75th	{-0.082,0.084}	{-0.1,0.11}	{-0.12,0.13}	0.0108	0.9965	0.0669	0.9963
5,000	0-75th	{-0.037,0.038}	{-0.047,0.05}	{-0.055,0.06}	0.0073	0.9975	0.0306	0.9979
1	75th-90th	{-1.09,1.84}	{-1.12,3.31}	{-1.13,4.96}	0.0145	1.1457	2.0174	1.1332
2	75th-90th	{-0.98,1.51}	{-1.03,2.6}	{-1.06,3.8}	0.0187	1.1082	1.4983	1.1081
5	75th-90th	{-0.79,1.1}	{-0.86,1.71}	{-0.91,2.45}	0.0119	1.0647	0.9398	1.0696
25	75th-90th	{-0.44,0.5}	{-0.53,0.75}	{-0.58,1}	0.0053	1.0290	0.4073	1.0195
50	75th-90th	{-0.33,0.37}	{-0.4,0.55}	{-0.45,0.7}	0.0037	1.0203	0.2936	1.0181
250	75th-90th	{-0.16,0.18}	{-0.2,0.24}	{-0.22,0.29}	0.0016	1.0091	0.1318	1.0072
1,000	75th-90th	{-0.082,0.087}	{-0.1,0.11}	{-0.12,0.14}	0.0009	1.0048	0.0657	1.0058
5,000	75th-90th	{-0.035,0.039}	{-0.045,0.049}	{-0.052,0.057}	0.0005	1.0023	0.0288	1.0037
1	90th-100th	{-1.17,2}	{-1.2,3.81}	{-1.24,5.85}	0.0487	1.2201	2.2478	1.2353
2	90th-100th	{-1.04,1.59}	{-1.09,2.64}	{-1.13,3.85}	0.0345	1.1780	1.5090	1.1748
5	90th-100th	{-0.82,1.08}	{-0.9,1.71}	{-0.96,2.39}	0.0309	1.1206	0.9359	1.1171
25	90th-100th	{-0.45,0.54}	{-0.55,0.79}	{-0.61,1.07}	0.0354	1.0608	0.4327	1.0635
50	90th-100th	{-0.34,0.37}	{-0.4,0.53}	{-0.45,0.7}	0.0387	1.0477	0.2984	1.0449
250	90th-100th	{-0.16,0.18}	{-0.2,0.23}	{-0.23,0.28}	0.0337	1.0269	0.1341	1.0238
1,000	90th-100th	{-0.083,0.087}	{-0.11,0.11}	{-0.13,0.14}	0.0233	1.0194	0.0704	1.0183
5,000	90th-100th	{-0.039,0.042}	{-0.05,0.054}	{-0.058,0.064}	0.0147	1.0145	0.0347	1.0142

Standard Model: HCC Using CY2007 Claims

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.5%	0.9590
2	12.6%	0.7873
5	13.4%	0.5654
25	19.1%	0.2902
50	30.9%	0.2076
250	66.9%	0.0977
1,000	85.2%	0.0514
5,000	92.5%	0.0241

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.17,1.34}	{-1.6,2.82}	{-2.09,4.62}	0.8308	1.0033	2.0781	1.0030
2	All	{-0.96,1.24}	{-1.24,2.22}	{-1.53,3.36}	0.5902	0.9975	1.4598	0.9983
5	All	{-0.73,0.92}	{-0.89,1.47}	{-1.05,2.1}	0.3903	0.9963	0.9156	0.9931
25	All	{-0.42,0.48}	{-0.5,0.7}	{-0.57,0.96}	0.2198	1.0016	0.4343	1.0004
50	All	{-0.31,0.35}	{-0.37,0.5}	{-0.43,0.64}	0.2037	0.9987	0.3263	0.9999
250	All	{-0.15,0.16}	{-0.19,0.21}	{-0.22,0.26}	0.2028	1.0009	0.2164	0.9997
1,000	All	{-0.078,0.084}	{-0.1,0.11}	{-0.12,0.13}	0.1807	0.9976	0.1712	0.9983
5,000	All	{-0.036,0.038}	{-0.048,0.049}	{-0.06,0.06}	0.1305	1.0005	0.1172	1.0000
1	0-75th	{-0.73,1.01}	{-0.86,2.19}	{-0.96,3.65}	0.2745	0.6300	1.4321	0.6779
2	0-75th	{-0.7,1.06}	{-0.82,1.9}	{-0.91,2.84}	0.2531	0.7262	1.1041	0.7603
5	0-75th	{-0.61,0.84}	{-0.71,1.34}	{-0.78,1.88}	0.2089	0.8192	0.7629	0.8399
25	0-75th	{-0.38,0.46}	{-0.45,0.68}	{-0.51,0.9}	0.1279	0.9151	0.3824	0.9251
50	0-75th	{-0.28,0.34}	{-0.35,0.48}	{-0.4,0.62}	0.1203	0.9316	0.2774	0.9397
250	0-75th	{-0.14,0.16}	{-0.18,0.21}	{-0.21,0.26}	0.1060	0.9585	0.1505	0.9632
1,000	0-75th	{-0.074,0.087}	{-0.095,0.11}	{-0.11,0.13}	0.1043	0.9693	0.1098	0.9734
5,000	0-75th	{-0.032,0.04}	{-0.042,0.052}	{-0.05,0.063}	0.0688	0.9762	0.0655	0.9790
1	75th-90th	{-1.47,2.05}	{-1.6,3.79}	{-1.71,5.76}	0.2161	1.5655	2.3340	1.4768
2	75th-90th	{-1.24,1.63}	{-1.35,2.76}	{-1.44,4.06}	0.1480	1.4654	1.6391	1.3960
5	75th-90th	{-0.93,1.1}	{-1.04,1.76}	{-1.11,2.5}	0.0870	1.3324	1.0079	1.2817
25	75th-90th	{-0.47,0.51}	{-0.56,0.76}	{-0.62,1.05}	0.0352	1.1597	0.4237	1.1371
50	75th-90th	{-0.34,0.37}	{-0.41,0.53}	{-0.46,0.67}	0.0240	1.1129	0.2927	1.0985
250	75th-90th	{-0.17,0.16}	{-0.2,0.22}	{-0.23,0.27}	0.0105	1.0513	0.1282	1.0421
1,000	75th-90th	{-0.082,0.08}	{-0.1,0.11}	{-0.12,0.13}	0.0050	1.0254	0.0637	1.0233
5,000	75th-90th	{-0.035,0.033}	{-0.045,0.044}	{-0.055,0.053}	0.0024	1.0120	0.0272	1.0105
1	90th-100th	{-2.77,3.33}	{-3.27,5.98}	{-3.83,9.09}	0.9542	2.9613	3.9390	2.7309
2	90th-100th	{-1.92,2.29}	{-2.22,3.99}	{-2.52,5.95}	0.5563	2.3319	2.4626	2.1874
5	90th-100th	{-1.24,1.31}	{-1.41,2.12}	{-1.55,3.06}	0.3178	1.8200	1.2964	1.7085
25	90th-100th	{-0.57,0.57}	{-0.67,0.85}	{-0.77,1.2}	0.3095	1.4131	0.5657	1.3601
50	90th-100th	{-0.4,0.39}	{-0.49,0.58}	{-0.57,0.74}	0.3771	1.3304	0.4749	1.3035
250	90th-100th	{-0.2,0.15}	{-0.26,0.21}	{-0.33,0.26}	0.5009	1.2432	0.4659	1.2098
1,000	90th-100th	{-0.11,0.071}	{-0.15,0.095}	{-0.21,0.12}	0.4568	1.1686	0.4107	1.1474
5,000	90th-100th	{-0.091,0.027}	{-0.12,0.037}	{-0.16,0.045}	0.3209	1.1655	0.2841	1.1418

Lag: HCC Using CY2006-7 Less CY07 Q4

Accuracy Metrics

Group Size	R-Square	MAPE
1	10.1%	0.9649
2	10.5%	0.7954
5	11.4%	0.5796
25	17.4%	0.2911
50	28.4%	0.2146
250	59.0%	0.1010
1,000	80.1%	0.0526
5,000	89.0%	0.0254

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.17,1.36}	{-1.61,2.85}	{-2.11,4.64}	0.8121	0.9920	2.0461	0.9931
2	All	{-0.97,1.25}	{-1.27,2.25}	{-1.57,3.38}	0.5894	0.9921	1.4636	0.9931
5	All	{-0.75,0.94}	{-0.92,1.5}	{-1.08,2.13}	0.4026	1.0074	0.9350	1.0035
25	All	{-0.42,0.48}	{-0.51,0.71}	{-0.58,0.95}	0.2266	0.9946	0.4308	0.9960
50	All	{-0.32,0.35}	{-0.39,0.5}	{-0.44,0.65}	0.2192	1.0043	0.3316	1.0008
250	All	{-0.15,0.17}	{-0.19,0.22}	{-0.23,0.27}	0.1978	0.9987	0.2034	0.9981
1,000	All	{-0.081,0.084}	{-0.1,0.11}	{-0.12,0.13}	0.1745	0.9981	0.1563	0.9972
5,000	All	{-0.037,0.04}	{-0.049,0.053}	{-0.062,0.065}	0.1278	1.0002	0.1087	1.0003
1	0-75th	{-0.73,1.06}	{-0.86,2.29}	{-0.96,3.8}	0.2705	0.6276	1.4783	0.6955
2	0-75th	{-0.7,1.1}	{-0.82,1.97}	{-0.91,2.94}	0.2516	0.7209	1.1364	0.7706
5	0-75th	{-0.61,0.88}	{-0.71,1.39}	{-0.79,1.95}	0.2070	0.8273	0.7824	0.8576
25	0-75th	{-0.38,0.47}	{-0.45,0.68}	{-0.52,0.91}	0.1419	0.9088	0.3831	0.9243
50	0-75th	{-0.29,0.35}	{-0.35,0.5}	{-0.41,0.65}	0.1209	0.9351	0.2837	0.9443
250	0-75th	{-0.14,0.17}	{-0.18,0.22}	{-0.21,0.27}	0.1033	0.9597	0.1488	0.9668
1,000	0-75th	{-0.076,0.087}	{-0.096,0.11}	{-0.11,0.13}	0.1016	0.9698	0.1055	0.9740
5,000	0-75th	{-0.033,0.042}	{-0.043,0.056}	{-0.052,0.067}	0.0685	0.9764	0.0632	0.9806
1	75th-90th	{-1.46,2.07}	{-1.59,3.78}	{-1.68,5.68}	0.2121	1.5409	2.2796	1.4464
2	75th-90th	{-1.24,1.6}	{-1.35,2.72}	{-1.44,4}	0.1498	1.4602	1.6621	1.3772
5	75th-90th	{-0.95,1.08}	{-1.05,1.74}	{-1.12,2.49}	0.0865	1.3381	1.0347	1.2767
25	75th-90th	{-0.49,0.51}	{-0.57,0.78}	{-0.63,1.09}	0.0345	1.1583	0.4409	1.1360
50	75th-90th	{-0.37,0.35}	{-0.43,0.5}	{-0.5,0.65}	0.0247	1.1159	0.2938	1.0851
250	75th-90th	{-0.16,0.15}	{-0.2,0.21}	{-0.23,0.26}	0.0101	1.0513	0.1256	1.0394
1,000	75th-90th	{-0.082,0.074}	{-0.1,0.1}	{-0.12,0.12}	0.0050	1.0253	0.0625	1.0197
5,000	75th-90th	{-0.038,0.033}	{-0.048,0.045}	{-0.056,0.055}	0.0026	1.0120	0.0282	1.0093
1	90th-100th	{-2.79,3}	{-3.32,5.61}	{-3.89,8.67}	0.9421	2.9018	3.7823	2.5452
2	90th-100th	{-1.97,2.13}	{-2.28,3.68}	{-2.62,5.77}	0.5597	2.3239	2.4097	2.0858
5	90th-100th	{-1.31,1.25}	{-1.48,2.07}	{-1.65,3.13}	0.3885	1.8616	1.3438	1.6872
25	90th-100th	{-0.58,0.53}	{-0.68,0.85}	{-0.77,1.12}	0.3268	1.3927	0.5366	1.3240
50	90th-100th	{-0.44,0.38}	{-0.54,0.55}	{-0.63,0.73}	0.4382	1.3557	0.4937	1.2979
250	90th-100th	{-0.21,0.16}	{-0.28,0.22}	{-0.35,0.28}	0.5000	1.2126	0.4294	1.1703
1,000	90th-100th	{-0.13,0.069}	{-0.18,0.092}	{-0.3,0.12}	0.4365	1.1700	0.3613	1.1374
5,000	90th-100th	{-0.092,0.029}	{-0.16,0.041}	{-0.23,0.05}	0.3127	1.1612	0.2568	1.1350

Lag: HCC Using CY2006-7 Less CY07 Q3 & Q4

Accuracy Metrics

Group Size	R-Square	MAPE
1	8.9%	0.9774
2	9.7%	0.8086
5	10.0%	0.5812
25	14.4%	0.2932
50	23.5%	0.2130
250	54.4%	0.1006
1,000	72.9%	0.0531
5,000	85.4%	0.0260

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.19,1.38}	{-1.62,2.87}	{-2.12,4.72}	0.8083	0.9954	2.0605	0.9967
2	All	{-0.99,1.28}	{-1.29,2.28}	{-1.59,3.44}	0.6030	1.0037	1.4743	1.0034
5	All	{-0.75,0.95}	{-0.92,1.51}	{-1.08,2.15}	0.3942	0.9981	0.9221	0.9969
25	All	{-0.42,0.49}	{-0.5,0.72}	{-0.58,0.97}	0.2118	0.9918	0.4263	0.9935
50	All	{-0.32,0.35}	{-0.38,0.5}	{-0.44,0.65}	0.1964	0.9994	0.3174	0.9993
250	All	{-0.15,0.17}	{-0.19,0.22}	{-0.23,0.27}	0.1833	0.9979	0.1926	0.9989
1,000	All	{-0.08,0.086}	{-0.1,0.11}	{-0.12,0.14}	0.1573	0.9998	0.1376	0.9995
5,000	All	{-0.037,0.042}	{-0.049,0.053}	{-0.062,0.064}	0.1227	0.9997	0.1006	0.9997
1	0-75th	{-0.74,1.11}	{-0.86,2.35}	{-0.96,3.91}	0.2711	0.6331	1.5145	0.7100
2	0-75th	{-0.71,1.13}	{-0.82,2.02}	{-0.92,3.02}	0.2519	0.7297	1.1659	0.7876
5	0-75th	{-0.61,0.9}	{-0.71,1.41}	{-0.79,1.97}	0.2049	0.8228	0.7848	0.8600
25	0-75th	{-0.38,0.48}	{-0.45,0.69}	{-0.5,0.93}	0.1406	0.9086	0.3862	0.9283
50	0-75th	{-0.29,0.35}	{-0.35,0.49}	{-0.4,0.63}	0.1164	0.9342	0.2792	0.9471
250	0-75th	{-0.14,0.17}	{-0.18,0.22}	{-0.21,0.27}	0.1058	0.9591	0.1491	0.9676
1,000	0-75th	{-0.074,0.089}	{-0.094,0.11}	{-0.11,0.14}	0.0880	0.9711	0.0947	0.9771
5,000	0-75th	{-0.033,0.044}	{-0.044,0.056}	{-0.052,0.067}	0.0657	0.9771	0.0607	0.9816
1	75th-90th	{-1.46,2.03}	{-1.59,3.81}	{-1.68,5.84}	0.2064	1.5472	2.3709	1.4514
2	75th-90th	{-1.25,1.61}	{-1.36,2.76}	{-1.45,4.07}	0.1474	1.4706	1.6623	1.3795
5	75th-90th	{-0.95,1.09}	{-1.05,1.74}	{-1.12,2.51}	0.0868	1.3274	1.0275	1.2624
25	75th-90th	{-0.5,0.51}	{-0.58,0.76}	{-0.64,1.04}	0.0338	1.1537	0.4361	1.1160
50	75th-90th	{-0.36,0.37}	{-0.43,0.53}	{-0.49,0.68}	0.0229	1.1131	0.2993	1.0897
250	75th-90th	{-0.17,0.16}	{-0.21,0.21}	{-0.24,0.27}	0.0098	1.0504	0.1296	1.0399
1,000	75th-90th	{-0.084,0.077}	{-0.1,0.1}	{-0.12,0.12}	0.0051	1.0252	0.0619	1.0199
5,000	75th-90th	{-0.038,0.033}	{-0.046,0.046}	{-0.052,0.052}	0.0025	1.0120	0.0277	1.0091
1	90th-100th	{-2.83,2.87}	{-3.37,5.45}	{-3.95,8.45}	0.9449	2.8897	3.7082	2.4694
2	90th-100th	{-2.02,2.04}	{-2.37,3.64}	{-2.75,5.48}	0.6353	2.3565	2.3914	2.0561
5	90th-100th	{-1.3,1.21}	{-1.47,2.06}	{-1.64,3}	0.4005	1.8193	1.2879	1.6251
25	90th-100th	{-0.59,0.55}	{-0.68,0.84}	{-0.79,1.07}	0.2499	1.3727	0.5157	1.2986
50	90th-100th	{-0.43,0.34}	{-0.51,0.57}	{-0.6,0.78}	0.3624	1.3171	0.4362	1.2552
250	90th-100th	{-0.21,0.15}	{-0.28,0.22}	{-0.36,0.28}	0.4375	1.2105	0.3736	1.1719
1,000	90th-100th	{-0.13,0.066}	{-0.22,0.092}	{-0.35,0.11}	0.3886	1.1766	0.3052	1.1367
5,000	90th-100th	{-0.096,0.028}	{-0.16,0.038}	{-0.26,0.051}	0.3022	1.1510	0.2345	1.1218

Eligibility: HCC Using CY2007 Q2-4; 9 Months

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.3%	0.9547
2	12.7%	0.7849
5	14.3%	0.5697
25	26.7%	0.2895
50	24.5%	0.2104
250	66.9%	0.0969
1,000	86.1%	0.0504
5,000	92.6%	0.0238

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.14,1.35}	{-1.56,2.8}	{-2.02,4.59}	0.8023	0.9956	2.0517	0.9958
2	All	{-0.95,1.24}	{-1.22,2.21}	{-1.5,3.34}	0.5807	0.9945	1.4615	0.9953
5	All	{-0.73,0.93}	{-0.89,1.49}	{-1.04,2.13}	0.3940	1.0009	0.9347	1.0001
25	All	{-0.42,0.48}	{-0.5,0.7}	{-0.57,0.96}	0.2646	1.0052	0.4551	1.0043
50	All	{-0.31,0.34}	{-0.38,0.5}	{-0.43,0.65}	0.1791	0.9966	0.3153	0.9947
250	All	{-0.15,0.16}	{-0.18,0.22}	{-0.22,0.26}	0.1962	1.0031	0.2152	1.0038
1,000	All	{-0.078,0.081}	{-0.1,0.11}	{-0.12,0.13}	0.1811	1.0001	0.1742	1.0000
5,000	All	{-0.037,0.038}	{-0.048,0.049}	{-0.06,0.059}	0.1243	0.9994	0.1143	0.9996
1	0-75th	{-0.73,1.01}	{-0.86,2.17}	{-0.95,3.63}	0.2653	0.6366	1.4238	0.6777
2	0-75th	{-0.7,1.05}	{-0.82,1.88}	{-0.91,2.83}	0.2461	0.7295	1.1110	0.7579
5	0-75th	{-0.61,0.85}	{-0.71,1.34}	{-0.78,1.89}	0.2001	0.8256	0.7721	0.8426
25	0-75th	{-0.38,0.46}	{-0.46,0.66}	{-0.52,0.9}	0.1369	0.9124	0.3833	0.9220
50	0-75th	{-0.29,0.33}	{-0.35,0.48}	{-0.4,0.63}	0.1178	0.9343	0.2790	0.9383
250	0-75th	{-0.14,0.16}	{-0.18,0.21}	{-0.2,0.26}	0.0984	0.9618	0.1482	0.9667
1,000	0-75th	{-0.073,0.084}	{-0.094,0.11}	{-0.11,0.13}	0.0977	0.9707	0.1067	0.9741
5,000	0-75th	{-0.033,0.04}	{-0.043,0.052}	{-0.053,0.062}	0.0655	0.9773	0.0634	0.9803
1	75th-90th	{-1.44,2.05}	{-1.57,3.74}	{-1.66,5.73}	0.2077	1.5349	2.3059	1.4521
2	75th-90th	{-1.22,1.63}	{-1.33,2.76}	{-1.41,4.06}	0.1437	1.4488	1.6467	1.3900
5	75th-90th	{-0.93,1.1}	{-1.03,1.75}	{-1.1,2.47}	0.0867	1.3233	1.0158	1.2812
25	75th-90th	{-0.49,0.52}	{-0.57,0.77}	{-0.63,1.04}	0.0352	1.1589	0.4320	1.1398
50	75th-90th	{-0.34,0.37}	{-0.41,0.55}	{-0.47,0.7}	0.0236	1.1115	0.2983	1.1037
250	75th-90th	{-0.16,0.16}	{-0.19,0.22}	{-0.22,0.28}	0.0101	1.0501	0.1259	1.0466
1,000	75th-90th	{-0.084,0.077}	{-0.1,0.1}	{-0.12,0.13}	0.0047	1.0252	0.0630	1.0226
5,000	75th-90th	{-0.036,0.033}	{-0.047,0.041}	{-0.056,0.049}	0.0024	1.0117	0.0268	1.0104
1	90th-100th	{-2.67,3.36}	{-3.19,5.96}	{-3.7,9.02}	0.9452	2.8775	3.8651	2.6959
2	90th-100th	{-1.88,2.26}	{-2.18,3.9}	{-2.5,5.86}	0.5860	2.3017	2.4431	2.1844
5	90th-100th	{-1.23,1.36}	{-1.39,2.21}	{-1.55,3.17}	0.4043	1.8320	1.3552	1.7591
25	90th-100th	{-0.57,0.57}	{-0.69,0.86}	{-0.79,1.18}	0.4914	1.4704	0.6632	1.4180
50	90th-100th	{-0.4,0.39}	{-0.48,0.57}	{-0.55,0.73}	0.2827	1.2916	0.4098	1.2541
250	90th-100th	{-0.19,0.16}	{-0.25,0.22}	{-0.3,0.27}	0.4890	1.2421	0.4645	1.2178
1,000	90th-100th	{-0.11,0.068}	{-0.16,0.092}	{-0.22,0.12}	0.4645	1.1826	0.4248	1.1607
5,000	90th-100th	{-0.068,0.029}	{-0.1,0.038}	{-0.12,0.05}	0.3113	1.1465	0.2829	1.1284

Eligibility: HCC Using CY2007 Q3-4; 6 Months

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.3%	0.9651
2	12.3%	0.7903
5	13.7%	0.5714
25	22.3%	0.2903
50	30.0%	0.2076
250	65.1%	0.0967
1,000	84.4%	0.0503
5,000	91.7%	0.0232

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.14,1.37}	{-1.52,2.82}	{-1.96,4.64}	0.7882	1.0057	2.0656	1.0028
2	All	{-0.95,1.25}	{-1.21,2.23}	{-1.48,3.36}	0.5584	0.9993	1.4528	0.9964
5	All	{-0.72,0.93}	{-0.88,1.5}	{-1.03,2.15}	0.3735	1.0008	0.9310	1.0004
25	All	{-0.41,0.48}	{-0.5,0.71}	{-0.56,0.96}	0.2327	1.0069	0.4431	1.0054
50	All	{-0.31,0.35}	{-0.37,0.5}	{-0.42,0.65}	0.1914	0.9969	0.3258	0.9976
250	All	{-0.15,0.16}	{-0.19,0.21}	{-0.22,0.26}	0.1831	0.9997	0.2080	0.9992
1,000	All	{-0.08,0.08}	{-0.1,0.11}	{-0.12,0.13}	0.1615	1.0005	0.1615	0.9993
5,000	All	{-0.037,0.037}	{-0.047,0.048}	{-0.058,0.057}	0.1076	0.9983	0.1022	0.9979
1	0-75th	{-0.75,1.02}	{-0.87,2.21}	{-0.96,3.66}	0.2573	0.6567	1.4376	0.6860
2	0-75th	{-0.71,1.06}	{-0.82,1.9}	{-0.91,2.83}	0.2366	0.7437	1.1130	0.7650
5	0-75th	{-0.61,0.84}	{-0.71,1.34}	{-0.78,1.9}	0.1915	0.8323	0.7701	0.8447
25	0-75th	{-0.38,0.46}	{-0.46,0.67}	{-0.52,0.9}	0.1212	0.9205	0.3809	0.9251
50	0-75th	{-0.29,0.34}	{-0.35,0.47}	{-0.4,0.62}	0.1125	0.9351	0.2791	0.9390
250	0-75th	{-0.14,0.16}	{-0.18,0.21}	{-0.21,0.26}	0.0962	0.9618	0.1475	0.9651
1,000	0-75th	{-0.077,0.082}	{-0.097,0.11}	{-0.12,0.13}	0.0841	0.9722	0.0980	0.9734
5,000	0-75th	{-0.034,0.038}	{-0.043,0.049}	{-0.052,0.059}	0.0619	0.9782	0.0622	0.9796
1	75th-90th	{-1.42,2.07}	{-1.54,3.76}	{-1.63,5.69}	0.1930	1.5181	2.3256	1.4537
2	75th-90th	{-1.21,1.62}	{-1.31,2.75}	{-1.39,4.01}	0.1395	1.4342	1.6407	1.3736
5	75th-90th	{-0.92,1.11}	{-1.02,1.76}	{-1.08,2.55}	0.0838	1.3147	1.0171	1.2816
25	75th-90th	{-0.47,0.53}	{-0.55,0.82}	{-0.61,1.08}	0.0349	1.1523	0.4365	1.1479
50	75th-90th	{-0.34,0.37}	{-0.4,0.52}	{-0.46,0.69}	0.0231	1.1070	0.2873	1.1056
250	75th-90th	{-0.16,0.16}	{-0.2,0.21}	{-0.24,0.27}	0.0101	1.0482	0.1274	1.0409
1,000	75th-90th	{-0.079,0.075}	{-0.098,0.1}	{-0.11,0.12}	0.0050	1.0250	0.0610	1.0219
5,000	75th-90th	{-0.037,0.035}	{-0.046,0.045}	{-0.056,0.054}	0.0024	1.0114	0.0279	1.0105
1	90th-100th	{-2.64,3.32}	{-3.14,6}	{-3.7,9.24}	0.9702	2.8511	3.8848	2.6998
2	90th-100th	{-1.85,2.35}	{-2.12,3.98}	{-2.42,5.95}	0.5397	2.2663	2.4077	2.1689
5	90th-100th	{-1.2,1.44}	{-1.35,2.27}	{-1.5,3.27}	0.3490	1.7927	1.3459	1.7457
25	90th-100th	{-0.56,0.57}	{-0.67,0.85}	{-0.77,1.1}	0.3971	1.4363	0.6003	1.3935
50	90th-100th	{-0.39,0.41}	{-0.47,0.59}	{-0.54,0.77}	0.3670	1.2954	0.4822	1.2757
250	90th-100th	{-0.18,0.16}	{-0.23,0.22}	{-0.29,0.27}	0.4549	1.2108	0.4435	1.1923
1,000	90th-100th	{-0.11,0.076}	{-0.14,0.099}	{-0.18,0.12}	0.4124	1.1758	0.3895	1.1598
5,000	90th-100th	{-0.06,0.031}	{-0.075,0.042}	{-0.093,0.048}	0.2577	1.1299	0.2400	1.1164

Eligibility: HCC Using CY2007 Q4; 3 Months

Accuracy Metrics

Group Size	R-Square	MAPE
1	11.6%	0.9720
2	11.4%	0.7942
5	14.4%	0.5775
25	23.7%	0.2915
50	23.3%	0.2118
250	59.9%	0.0984
1,000	84.6%	0.0502
5,000	92.4%	0.0231

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.1,1.38}	{-1.46,2.86}	{-1.85,4.67}	0.7335	1.0001	2.0646	0.9989
2	All	{-0.92,1.26}	{-1.16,2.23}	{-1.4,3.37}	0.5187	0.9949	1.4501	0.9928
5	All	{-0.72,0.94}	{-0.86,1.51}	{-1,2.16}	0.3746	1.0018	0.9463	1.0012
25	All	{-0.41,0.49}	{-0.5,0.71}	{-0.56,0.98}	0.2322	1.0073	0.4512	1.0088
50	All	{-0.31,0.35}	{-0.38,0.51}	{-0.44,0.66}	0.1629	0.9965	0.3168	0.9960
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.22,0.26}	0.1580	0.9997	0.1964	0.9998
1,000	All	{-0.078,0.083}	{-0.099,0.11}	{-0.12,0.13}	0.1594	1.0006	0.1626	1.0012
5,000	All	{-0.036,0.037}	{-0.047,0.049}	{-0.057,0.06}	0.1086	0.9990	0.1072	0.9990
1	0-75th	{-0.77,1.03}	{-0.88,2.24}	{-0.97,3.75}	0.2391	0.6797	1.4869	0.6953
2	0-75th	{-0.72,1.07}	{-0.82,1.92}	{-0.9,2.89}	0.2161	0.7599	1.1261	0.7713
5	0-75th	{-0.62,0.85}	{-0.71,1.36}	{-0.78,1.93}	0.1772	0.8396	0.7811	0.8468
25	0-75th	{-0.39,0.46}	{-0.46,0.67}	{-0.51,0.91}	0.1173	0.9248	0.3844	0.9286
50	0-75th	{-0.29,0.34}	{-0.36,0.49}	{-0.41,0.64}	0.1056	0.9390	0.2812	0.9419
250	0-75th	{-0.15,0.16}	{-0.18,0.21}	{-0.21,0.26}	0.0885	0.9649	0.1462	0.9671
1,000	0-75th	{-0.075,0.083}	{-0.095,0.11}	{-0.11,0.13}	0.0864	0.9744	0.1010	0.9766
5,000	0-75th	{-0.035,0.038}	{-0.044,0.05}	{-0.054,0.061}	0.0588	0.9796	0.0612	0.9807
1	75th-90th	{-1.37,2.05}	{-1.48,3.75}	{-1.57,5.69}	0.1806	1.4664	2.2693	1.4192
2	75th-90th	{-1.17,1.63}	{-1.26,2.73}	{-1.34,4.07}	0.1258	1.3851	1.6468	1.3494
5	75th-90th	{-0.9,1.11}	{-0.99,1.75}	{-1.06,2.45}	0.0798	1.2829	1.0055	1.2614
25	75th-90th	{-0.47,0.53}	{-0.55,0.78}	{-0.61,1.05}	0.0322	1.1440	0.4299	1.1430
50	75th-90th	{-0.35,0.37}	{-0.41,0.52}	{-0.47,0.68}	0.0222	1.1006	0.2968	1.0892
250	75th-90th	{-0.16,0.17}	{-0.2,0.22}	{-0.23,0.28}	0.0093	1.0456	0.1295	1.0407
1,000	75th-90th	{-0.08,0.084}	{-0.1,0.11}	{-0.12,0.12}	0.0047	1.0228	0.0631	1.0227
5,000	75th-90th	{-0.036,0.034}	{-0.047,0.042}	{-0.055,0.052}	0.0022	1.0107	0.0281	1.0102
1	90th-100th	{-2.46,3.38}	{-2.98,6.03}	{-3.49,9.15}	0.9433	2.7085	3.8285	2.6504
2	90th-100th	{-1.76,2.3}	{-2.04,3.85}	{-2.32,5.72}	0.5354	2.1740	2.3721	2.1200
5	90th-100th	{-1.18,1.49}	{-1.35,2.35}	{-1.53,3.39}	0.4633	1.7938	1.4116	1.7667
25	90th-100th	{-0.56,0.64}	{-0.67,0.94}	{-0.77,1.2}	0.4292	1.4210	0.6445	1.4084
50	90th-100th	{-0.39,0.42}	{-0.47,0.6}	{-0.53,0.78}	0.2531	1.2723	0.4160	1.2622
250	90th-100th	{-0.18,0.18}	{-0.22,0.23}	{-0.27,0.28}	0.3759	1.1924	0.3947	1.1838
1,000	90th-100th	{-0.096,0.079}	{-0.13,0.11}	{-0.17,0.13}	0.4070	1.1636	0.3919	1.1536
5,000	90th-100th	{-0.051,0.034}	{-0.066,0.048}	{-0.085,0.06}	0.2692	1.1272	0.2616	1.1192

Turnover: HCC Using CY2007 (10% New Mbrs)

Accuracy Metrics

Group Size	R-Square	MAPE
1	11.0%	0.9681
2	12.1%	0.7988
5	11.8%	0.5721
25	24.9%	0.2902
50	30.9%	0.2102
250	63.6%	0.0991
1,000	75.7%	0.0504
5,000	91.7%	0.0241

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.12,1.37}	{-1.52,2.85}	{-1.99,4.67}	0.7818	0.9941	2.0735	0.9985
2	All	{-0.95,1.26}	{-1.22,2.25}	{-1.51,3.39}	0.5800	1.0023	1.4793	1.0036
5	All	{-0.73,0.93}	{-0.89,1.49}	{-1.04,2.14}	0.3639	0.9976	0.9183	0.9943
25	All	{-0.41,0.48}	{-0.49,0.71}	{-0.57,0.95}	0.2540	1.0000	0.4510	1.0014
50	All	{-0.31,0.35}	{-0.38,0.5}	{-0.43,0.66}	0.2098	0.9992	0.3323	1.0009
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.22,0.27}	0.1899	0.9999	0.2090	1.0006
1,000	All	{-0.078,0.081}	{-0.1,0.11}	{-0.12,0.13}	0.1293	0.9997	0.1293	0.9993
5,000	All	{-0.037,0.038}	{-0.049,0.049}	{-0.062,0.059}	0.1207	1.0036	0.1095	1.0031
1	0-75th	{-0.78,1.06}	{-0.9,2.27}	{-0.98,3.8}	0.2752	0.6542	1.4992	0.7018
2	0-75th	{-0.72,1.09}	{-0.82,1.94}	{-0.91,2.9}	0.2400	0.7413	1.1355	0.7730
5	0-75th	{-0.62,0.86}	{-0.71,1.36}	{-0.79,1.93}	0.1948	0.8317	0.7683	0.8487
25	0-75th	{-0.38,0.46}	{-0.45,0.68}	{-0.51,0.9}	0.1303	0.9147	0.3827	0.9251
50	0-75th	{-0.29,0.35}	{-0.35,0.49}	{-0.4,0.64}	0.1161	0.9344	0.2813	0.9442
250	0-75th	{-0.14,0.17}	{-0.18,0.22}	{-0.21,0.27}	0.0987	0.9619	0.1492	0.9670
1,000	0-75th	{-0.073,0.083}	{-0.094,0.11}	{-0.11,0.13}	0.0706	0.9732	0.0868	0.9764
5,000	0-75th	{-0.033,0.04}	{-0.043,0.051}	{-0.052,0.061}	0.0553	0.9797	0.0549	0.9823
1	75th-90th	{-1.39,1.99}	{-1.52,3.71}	{-1.62,5.59}	0.2069	1.4752	2.2629	1.4009
2	75th-90th	{-1.21,1.6}	{-1.32,2.74}	{-1.4,4.05}	0.1441	1.4323	1.6419	1.3728
5	75th-90th	{-0.93,1.09}	{-1.02,1.74}	{-1.09,2.48}	0.0842	1.3130	1.0229	1.2638
25	75th-90th	{-0.47,0.52}	{-0.55,0.76}	{-0.62,1.03}	0.0331	1.1492	0.4271	1.1336
50	75th-90th	{-0.35,0.35}	{-0.42,0.51}	{-0.47,0.7}	0.0232	1.1078	0.2920	1.0939
250	75th-90th	{-0.16,0.16}	{-0.2,0.22}	{-0.23,0.26}	0.0098	1.0481	0.1260	1.0414
1,000	75th-90th	{-0.08,0.076}	{-0.1,0.1}	{-0.12,0.12}	0.0051	1.0258	0.0618	1.0207
5,000	75th-90th	{-0.039,0.034}	{-0.048,0.045}	{-0.055,0.055}	0.0025	1.0121	0.0281	1.0097
1	90th-100th	{-2.67,3.25}	{-3.18,5.9}	{-3.72,9.06}	0.9569	2.8256	3.8645	2.6225
2	90th-100th	{-1.9,2.3}	{-2.23,3.94}	{-2.58,6.05}	0.6235	2.3148	2.4863	2.1791
5	90th-100th	{-1.22,1.33}	{-1.37,2.21}	{-1.51,3.22}	0.2788	1.7693	1.3023	1.6818
25	90th-100th	{-0.57,0.56}	{-0.68,0.84}	{-0.76,1.18}	0.5047	1.4161	0.6728	1.3754
50	90th-100th	{-0.41,0.37}	{-0.49,0.58}	{-0.56,0.73}	0.4298	1.3221	0.5136	1.2869
250	90th-100th	{-0.19,0.16}	{-0.26,0.22}	{-0.31,0.28}	0.4772	1.2129	0.4460	1.1913
1,000	90th-100th	{-0.11,0.075}	{-0.15,0.098}	{-0.2,0.12}	0.3130	1.1596	0.2846	1.1385
5,000	90th-100th	{-0.078,0.03}	{-0.12,0.04}	{-0.14,0.051}	0.3010	1.1706	0.2675	1.1489

Turnover: HCC Using CY2007 (30% New Mbrs)

Accuracy Metrics

Group Size	R-Square	MAPE
1	8.6%	0.9948
2	9.8%	0.8183
5	9.7%	0.5840
25	16.5%	0.2946
50	23.6%	0.2122
250	51.8%	0.1008
1,000	80.6%	0.0516
5,000	85.9%	0.0235

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.07,1.42}	{-1.38,2.93}	{-1.84,4.77}	0.6983	1.0044	2.0550	1.0014
2	All	{-0.93,1.3}	{-1.15,2.3}	{-1.42,3.47}	0.5223	1.0066	1.4835	1.0065
5	All	{-0.73,0.96}	{-0.86,1.54}	{-1,2.19}	0.3270	0.9961	0.9210	0.9957
25	All	{-0.42,0.49}	{-0.5,0.72}	{-0.57,0.96}	0.2036	1.0000	0.4327	0.9997
50	All	{-0.32,0.35}	{-0.38,0.5}	{-0.44,0.67}	0.1787	1.0014	0.3194	1.0004
250	All	{-0.15,0.17}	{-0.19,0.23}	{-0.23,0.28}	0.1549	0.9996	0.1848	1.0005
1,000	All	{-0.08,0.084}	{-0.1,0.11}	{-0.12,0.13}	0.1568	1.0004	0.1506	1.0008
5,000	All	{-0.037,0.038}	{-0.049,0.048}	{-0.059,0.059}	0.0860	0.9976	0.0805	0.9975
1	0-75th	{-0.85,1.14}	{-0.94,2.45}	{-1.01,4.06}	0.2723	0.7172	1.6563	0.7526
2	0-75th	{-0.75,1.14}	{-0.84,2.05}	{-0.91,3.07}	0.2131	0.7825	1.2067	0.8087
5	0-75th	{-0.63,0.9}	{-0.72,1.42}	{-0.79,2}	0.1681	0.8502	0.7987	0.8657
25	0-75th	{-0.39,0.47}	{-0.46,0.69}	{-0.52,0.91}	0.1200	0.9254	0.3851	0.9331
50	0-75th	{-0.3,0.35}	{-0.36,0.49}	{-0.41,0.65}	0.0990	0.9445	0.2830	0.9506
250	0-75th	{-0.15,0.17}	{-0.18,0.23}	{-0.21,0.28}	0.0901	0.9673	0.1478	0.9727
1,000	0-75th	{-0.076,0.087}	{-0.097,0.11}	{-0.11,0.13}	0.0828	0.9769	0.0959	0.9801
5,000	0-75th	{-0.034,0.039}	{-0.045,0.05}	{-0.054,0.06}	0.0528	0.9814	0.0540	0.9833
1	75th-90th	{-1.23,1.91}	{-1.34,3.54}	{-1.43,5.38}	0.1631	1.3211	2.1141	1.2773
2	75th-90th	{-1.14,1.59}	{-1.24,2.7}	{-1.31,3.97}	0.1298	1.3442	1.5818	1.2989
5	75th-90th	{-0.9,1.08}	{-0.99,1.75}	{-1.05,2.47}	0.0757	1.2589	0.9986	1.2285
25	75th-90th	{-0.48,0.55}	{-0.56,0.78}	{-0.63,1.07}	0.0304	1.1336	0.4409	1.1236
50	75th-90th	{-0.35,0.37}	{-0.42,0.53}	{-0.47,0.68}	0.0210	1.0961	0.2945	1.0811
250	75th-90th	{-0.16,0.17}	{-0.2,0.22}	{-0.23,0.28}	0.0087	1.0439	0.1304	1.0392
1,000	75th-90th	{-0.082,0.078}	{-0.1,0.11}	{-0.12,0.13}	0.0044	1.0223	0.0629	1.0208
5,000	75th-90th	{-0.037,0.035}	{-0.048,0.046}	{-0.058,0.056}	0.0022	1.0105	0.0290	1.0092
1	90th-100th	{-2.5,2.96}	{-3,5.33}	{-3.52,8.21}	0.9350	2.6288	3.4984	2.4064
2	90th-100th	{-1.78,2.16}	{-2.1,3.7}	{-2.44,5.69}	0.6575	2.1826	2.4122	2.0525
5	90th-100th	{-1.16,1.31}	{-1.31,2.12}	{-1.46,3.09}	0.3081	1.6963	1.2662	1.6214
25	90th-100th	{-0.56,0.56}	{-0.68,0.86}	{-0.76,1.13}	0.3275	1.3595	0.5607	1.3128
50	90th-100th	{-0.39,0.39}	{-0.49,0.55}	{-0.56,0.73}	0.3560	1.2856	0.4444	1.2527
250	90th-100th	{-0.19,0.16}	{-0.23,0.21}	{-0.28,0.27}	0.3708	1.1752	0.3491	1.1506
1,000	90th-100th	{-0.11,0.078}	{-0.15,0.1}	{-0.22,0.12}	0.4112	1.1440	0.3638	1.1259
5,000	90th-100th	{-0.063,0.031}	{-0.084,0.044}	{-0.11,0.052}	0.2005	1.1003	0.1793	1.0867

Data Quality: HCC Using CY2007 (Ignore Inpatient Dx)

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.17%	0.9523
2	13.3%	0.7861
5	14.7%	0.5673
25	22.4%	0.2879
50	29.4%	0.2097
250	63.0%	0.0981
1,000	76.8%	0.0500
5,000	89.1%	0.0236

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.16,1.32}	{-1.59,2.78}	{-2.06,4.59}	0.8179	0.9972	2.0587	0.9943
2	All	{-0.96,1.24}	{-1.24,2.22}	{-1.53,3.36}	0.6031	0.9980	1.4617	0.9987
5	All	{-0.73,0.92}	{-0.89,1.48}	{-1.05,2.11}	0.4076	0.9993	0.9320	0.9966
25	All	{-0.41,0.48}	{-0.49,0.7}	{-0.57,0.95}	0.2412	0.9994	0.4406	0.9988
50	All	{-0.31,0.35}	{-0.38,0.5}	{-0.43,0.66}	0.2024	0.9969	0.3258	0.9968
250	All	{-0.15,0.16}	{-0.19,0.21}	{-0.22,0.26}	0.1849	0.9993	0.2046	0.9983
1,000	All	{-0.079,0.081}	{-0.1,0.1}	{-0.12,0.13}	0.1327	0.9989	0.1319	0.9983
5,000	All	{-0.036,0.039}	{-0.047,0.051}	{-0.058,0.062}	0.1009	0.9975	0.0926	0.9982
1	0-75th	{-0.73,0.99}	{-0.86,2.18}	{-0.96,3.63}	0.2742	0.6284	1.4209	0.6737
2	0-75th	{-0.7,1.05}	{-0.82,1.88}	{-0.91,2.82}	0.2542	0.7238	1.0999	0.7567
5	0-75th	{-0.61,0.84}	{-0.7,1.34}	{-0.79,1.87}	0.2093	0.8186	0.7624	0.8358
25	0-75th	{-0.38,0.46}	{-0.45,0.67}	{-0.51,0.9}	0.1346	0.9121	0.3791	0.9223
50	0-75th	{-0.29,0.34}	{-0.35,0.48}	{-0.39,0.64}	0.1229	0.9316	0.2818	0.9402
250	0-75th	{-0.14,0.16}	{-0.18,0.21}	{-0.21,0.26}	0.1036	0.9595	0.1503	0.9642
1,000	0-75th	{-0.075,0.082}	{-0.094,0.11}	{-0.11,0.13}	0.0733	0.9706	0.0883	0.9733
5,000	0-75th	{-0.033,0.041}	{-0.041,0.053}	{-0.05,0.064}	0.0606	0.9759	0.0594	0.9795
1	75th-90th	{-1.46,2.07}	{-1.6,3.79}	{-1.7,5.68}	0.2133	1.5625	2.3564	1.4757
2	75th-90th	{-1.24,1.64}	{-1.35,2.76}	{-1.43,4.04}	0.1476	1.4669	1.6505	1.4030
5	75th-90th	{-0.93,1.13}	{-1.03,1.8}	{-1.1,2.57}	0.0870	1.3339	1.0559	1.2985
25	75th-90th	{-0.47,0.51}	{-0.55,0.77}	{-0.61,1.07}	0.0354	1.1579	0.4362	1.1404
50	75th-90th	{-0.34,0.37}	{-0.41,0.54}	{-0.46,0.72}	0.0237	1.1121	0.2953	1.0962
250	75th-90th	{-0.16,0.16}	{-0.2,0.22}	{-0.23,0.27}	0.0102	1.0508	0.1293	1.0406
1,000	75th-90th	{-0.08,0.076}	{-0.1,0.1}	{-0.12,0.12}	0.0055	1.0267	0.0622	1.0238
5,000	75th-90th	{-0.035,0.035}	{-0.045,0.047}	{-0.055,0.058}	0.0027	1.0124	0.0277	1.0122
1	90th-100th	{-2.71,3.2}	{-3.21,5.92}	{-3.75,9}	0.9392	2.9147	3.8682	2.6770
2	90th-100th	{-1.92,2.31}	{-2.24,3.94}	{-2.56,5.89}	0.6307	2.3508	2.4622	2.2072
5	90th-100th	{-1.25,1.34}	{-1.42,2.17}	{-1.6,3.09}	0.4242	1.8531	1.3253	1.7499
25	90th-100th	{-0.58,0.57}	{-0.69,0.85}	{-0.78,1.15}	0.4192	1.4161	0.6118	1.3594
50	90th-100th	{-0.41,0.38}	{-0.5,0.56}	{-0.57,0.72}	0.3786	1.3137	0.4691	1.2723
250	90th-100th	{-0.2,0.15}	{-0.24,0.21}	{-0.32,0.26}	0.4435	1.2204	0.4193	1.1910
1,000	90th-100th	{-0.12,0.073}	{-0.15,0.1}	{-0.19,0.13}	0.3155	1.1693	0.2857	1.1483
5,000	90th-100th	{-0.072,0.027}	{-0.091,0.037}	{-0.11,0.045}	0.2260	1.1367	0.2027	1.1175

Data Quality: HCC Using CY2007 (Ignore Outpatient Dx)

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.1%	0.9553
2	12.8%	0.7901
5	14.5%	0.5694
25	22.3%	0.2872
50	30.8%	0.2105
250	56.9%	0.0983
1,000	84.2%	0.0519
5,000	92.6%	0.0241

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.16,1.34}	{-1.58,2.81}	{-2.07,4.63}	0.8211	0.9956	2.0635	0.9976
2	All	{-0.97,1.24}	{-1.25,2.22}	{-1.55,3.34}	0.6055	1.0034	1.4670	1.0012
5	All	{-0.73,0.93}	{-0.9,1.49}	{-1.05,2.11}	0.4103	0.9994	0.9394	1.0010
25	All	{-0.41,0.48}	{-0.5,0.7}	{-0.57,0.95}	0.2350	0.9963	0.4374	0.9965
50	All	{-0.31,0.35}	{-0.38,0.49}	{-0.44,0.64}	0.2091	0.9994	0.3299	0.9989
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.22,0.27}	0.1624	0.9946	0.1893	0.9964
1,000	All	{-0.079,0.085}	{-0.1,0.11}	{-0.12,0.13}	0.1807	1.0006	0.1693	1.0012
5,000	All	{-0.037,0.038}	{-0.048,0.05}	{-0.06,0.06}	0.1290	0.9994	0.1166	0.9993
1	0-75th	{-0.73,1.01}	{-0.85,2.2}	{-0.95,3.67}	0.2709	0.6282	1.4400	0.6803
2	0-75th	{-0.7,1.06}	{-0.82,1.9}	{-0.91,2.84}	0.2517	0.7275	1.1071	0.7621
5	0-75th	{-0.61,0.86}	{-0.71,1.35}	{-0.79,1.88}	0.2078	0.8192	0.7660	0.8418
25	0-75th	{-0.38,0.46}	{-0.45,0.68}	{-0.51,0.91}	0.1349	0.9094	0.3808	0.9213
50	0-75th	{-0.29,0.34}	{-0.35,0.48}	{-0.41,0.61}	0.1185	0.9333	0.2794	0.9395
250	0-75th	{-0.14,0.16}	{-0.18,0.21}	{-0.21,0.26}	0.1061	0.9581	0.1515	0.9644
1,000	0-75th	{-0.074,0.087}	{-0.094,0.11}	{-0.11,0.13}	0.0983	0.9708	0.1053	0.9751
5,000	0-75th	{-0.033,0.04}	{-0.042,0.052}	{-0.05,0.062}	0.0694	0.9760	0.0664	0.9790
1	75th-90th	{-1.45,2.05}	{-1.58,3.77}	{-1.67,5.73}	0.2087	1.5491	2.3165	1.4586
2	75th-90th	{-1.24,1.63}	{-1.35,2.79}	{-1.44,4.05}	0.1503	1.4697	1.6633	1.3992
5	75th-90th	{-0.93,1.09}	{-1.03,1.73}	{-1.1,2.5}	0.0867	1.3319	1.0243	1.2882
25	75th-90th	{-0.47,0.52}	{-0.56,0.76}	{-0.62,1.02}	0.0355	1.1574	0.4221	1.1374
50	75th-90th	{-0.35,0.39}	{-0.42,0.56}	{-0.48,0.72}	0.0240	1.1137	0.3056	1.1055
250	75th-90th	{-0.16,0.16}	{-0.2,0.23}	{-0.23,0.28}	0.0105	1.0515	0.1289	1.0473
1,000	75th-90th	{-0.08,0.082}	{-0.1,0.11}	{-0.12,0.13}	0.0051	1.0257	0.0640	1.0236
5,000	75th-90th	{-0.038,0.035}	{-0.047,0.048}	{-0.054,0.055}	0.0025	1.0122	0.0281	1.0108
1	90th-100th	{-2.74,3.25}	{-3.26,5.86}	{-3.81,8.99}	0.9613	2.9250	3.8789	2.6888
2	90th-100th	{-1.96,2.28}	{-2.28,3.91}	{-2.63,5.83}	0.6183	2.3738	2.4659	2.1979
5	90th-100th	{-1.25,1.39}	{-1.42,2.28}	{-1.59,3.37}	0.4597	1.8523	1.3972	1.7649
25	90th-100th	{-0.57,0.55}	{-0.68,0.83}	{-0.75,1.16}	0.3884	1.4055	0.6023	1.3486
50	90th-100th	{-0.4,0.37}	{-0.48,0.55}	{-0.55,0.73}	0.4168	1.3232	0.4875	1.2849
250	90th-100th	{-0.19,0.15}	{-0.23,0.22}	{-0.27,0.26}	0.3589	1.1832	0.3503	1.1608
1,000	90th-100th	{-0.12,0.074}	{-0.17,0.1}	{-0.26,0.12}	0.4600	1.1870	0.4065	1.1632
5,000	90th-100th	{-0.078,0.026}	{-0.11,0.038}	{-0.14,0.05}	0.3188	1.1555	0.2833	1.1346

Data Quality: HCC Using CY2007 (Ignore Professional Dx)

Accuracy Metrics

Group Size	R-Square	MAPE
1	9.4%	0.9907
2	9.4%	0.8111
5	11.3%	0.5853
25	19.0%	0.2914
50	28.7%	0.2141
250	58.7%	0.0995
1,000	79.6%	0.0515
5,000	88.2%	0.0237

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.09,1.41}	{-1.42,2.92}	{-1.8,4.77}	0.6674	1.0008	2.0641	0.9985
2	All	{-0.92,1.29}	{-1.15,2.3}	{-1.38,3.47}	0.4726	0.9969	1.4594	0.9974
5	All	{-0.73,0.95}	{-0.86,1.54}	{-0.99,2.19}	0.3386	1.0000	0.9429	1.0001
25	All	{-0.42,0.48}	{-0.5,0.71}	{-0.56,0.96}	0.1926	1.0015	0.4349	1.0007
50	All	{-0.31,0.36}	{-0.38,0.51}	{-0.44,0.66}	0.1867	0.9993	0.3307	1.0001
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.22,0.27}	0.1573	1.0002	0.1968	1.0006
1,000	All	{-0.079,0.084}	{-0.1,0.11}	{-0.12,0.13}	0.1385	0.9996	0.1458	1.0001
5,000	All	{-0.037,0.038}	{-0.048,0.05}	{-0.058,0.061}	0.0891	0.9979	0.0896	0.9982
1	0-75th	{-0.8,1.08}	{-0.9,2.32}	{-0.98,3.85}	0.2235	0.7109	1.5208	0.7185
2	0-75th	{-0.74,1.1}	{-0.84,1.98}	{-0.91,2.98}	0.2000	0.7828	1.1644	0.7923
5	0-75th	{-0.63,0.87}	{-0.72,1.4}	{-0.79,1.98}	0.1627	0.8549	0.7956	0.8630
25	0-75th	{-0.39,0.46}	{-0.46,0.67}	{-0.52,0.9}	0.1074	0.9300	0.3819	0.9311
50	0-75th	{-0.3,0.35}	{-0.36,0.5}	{-0.41,0.64}	0.0989	0.9448	0.2831	0.9489
250	0-75th	{-0.15,0.16}	{-0.18,0.22}	{-0.21,0.27}	0.0825	0.9674	0.1449	0.9694
1,000	0-75th	{-0.076,0.085}	{-0.095,0.11}	{-0.11,0.13}	0.0716	0.9764	0.0913	0.9786
5,000	0-75th	{-0.035,0.038}	{-0.045,0.05}	{-0.055,0.061}	0.0544	0.9810	0.0574	0.9821
1	75th-90th	{-1.32,2.13}	{-1.43,3.89}	{-1.51,5.98}	0.1632	1.4132	2.3366	1.4154
2	75th-90th	{-1.15,1.7}	{-1.24,2.86}	{-1.31,4.19}	0.1148	1.3525	1.6696	1.3539
5	75th-90th	{-0.89,1.09}	{-0.98,1.76}	{-1.05,2.53}	0.0703	1.2588	1.0103	1.2379
25	75th-90th	{-0.47,0.53}	{-0.55,0.8}	{-0.61,1.06}	0.0295	1.1279	0.4329	1.1249
50	75th-90th	{-0.35,0.38}	{-0.42,0.53}	{-0.46,0.68}	0.0197	1.0910	0.2955	1.0842
250	75th-90th	{-0.16,0.16}	{-0.2,0.22}	{-0.23,0.27}	0.0084	1.0416	0.1260	1.0378
1,000	75th-90th	{-0.08,0.079}	{-0.1,0.1}	{-0.12,0.12}	0.0042	1.0209	0.0628	1.0187
5,000	75th-90th	{-0.038,0.034}	{-0.047,0.046}	{-0.054,0.056}	0.0019	1.0097	0.0277	1.0087
1	90th-100th	{-2.36,3.22}	{-2.88,5.78}	{-3.43,8.8}	0.8679	2.5494	3.7456	2.4655
2	90th-100th	{-1.72,2.23}	{-1.97,3.83}	{-2.23,5.72}	0.4790	2.0694	2.3310	2.0010
5	90th-100th	{-1.16,1.4}	{-1.32,2.29}	{-1.46,3.34}	0.4389	1.7000	1.3911	1.6716
25	90th-100th	{-0.54,0.59}	{-0.63,0.92}	{-0.71,1.25}	0.3171	1.3485	0.5870	1.3355
50	90th-100th	{-0.39,0.4}	{-0.47,0.59}	{-0.56,0.76}	0.4080	1.2703	0.5144	1.2576
250	90th-100th	{-0.18,0.19}	{-0.23,0.26}	{-0.29,0.32}	0.3903	1.1833	0.4062	1.1785
1,000	90th-100th	{-0.1,0.095}	{-0.13,0.12}	{-0.22,0.15}	0.3583	1.1423	0.3499	1.1333
5,000	90th-100th	{-0.05,0.041}	{-0.068,0.057}	{-0.097,0.077}	0.2070	1.1072	0.2031	1.1034

Baseline: Age/Gender Slope using CY2007 Allowed Cost

Accuracy Metrics

Group Size	R-Square	MAPE
1	0.5%	1.0824
2	0.6%	0.8773
5	0.5%	0.6226
25	0.9%	0.3138
50	1.4%	0.2237
250	6.5%	0.1043
1,000	18.3%	0.0533
5,000	35.2%	0.0241

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.02,1.6}	{-1.09,3.24}	{-1.13,5.17}	0.1466	1.0021	2.0590	1.0011
2	All	{-0.9,1.42}	{-0.97,2.49}	{-1.02,3.74}	0.1061	1.0001	1.4572	0.9995
5	All	{-0.75,1.03}	{-0.82,1.66}	{-0.87,2.35}	0.0704	1.0001	0.9273	1.0037
25	All	{-0.44,0.53}	{-0.51,0.78}	{-0.57,1.04}	0.0430	0.9995	0.4201	1.0002
50	All	{-0.33,0.38}	{-0.39,0.54}	{-0.44,0.7}	0.0359	1.0000	0.2930	1.0023
250	All	{-0.16,0.17}	{-0.2,0.23}	{-0.23,0.29}	0.0341	1.0000	0.1372	1.0017
1,000	All	{-0.085,0.084}	{-0.11,0.11}	{-0.13,0.14}	0.0324	1.0003	0.0751	0.9990
5,000	All	{-0.038,0.039}	{-0.049,0.052}	{-0.057,0.063}	0.0229	0.9998	0.0388	1.0000
1	0-75th	{-0.93,1.46}	{-0.99,3.1}	{-1.03,5.07}	0.1067	0.9287	2.0340	0.9271
2	0-75th	{-0.87,1.37}	{-0.92,2.44}	{-0.96,3.7}	0.0766	0.9537	1.4371	0.9535
5	0-75th	{-0.74,1.02}	{-0.8,1.64}	{-0.84,2.35}	0.0512	0.9703	0.9225	0.9748
25	0-75th	{-0.43,0.53}	{-0.51,0.78}	{-0.56,1.04}	0.0332	0.9839	0.4171	0.9861
50	0-75th	{-0.33,0.38}	{-0.39,0.54}	{-0.44,0.69}	0.0270	0.9878	0.2918	0.9901
250	0-75th	{-0.16,0.17}	{-0.2,0.23}	{-0.23,0.29}	0.0270	0.9921	0.1352	0.9937
1,000	0-75th	{-0.085,0.084}	{-0.11,0.11}	{-0.13,0.14}	0.0250	0.9942	0.0725	0.9931
5,000	0-75th	{-0.038,0.039}	{-0.049,0.051}	{-0.057,0.063}	0.0181	0.9949	0.0361	0.9951
1	75th-90th	{-1.09,1.86}	{-1.12,3.33}	{-1.13,5.02}	0.0140	1.1453	2.0137	1.1384
2	75th-90th	{-0.98,1.5}	{-1.03,2.57}	{-1.06,3.79}	0.0187	1.1086	1.4722	1.1009
5	75th-90th	{-0.79,1.06}	{-0.86,1.66}	{-0.91,2.38}	0.0126	1.0660	0.9261	1.0658
25	75th-90th	{-0.45,0.52}	{-0.53,0.78}	{-0.58,1.04}	0.0054	1.0297	0.4181	1.0233
50	75th-90th	{-0.32,0.37}	{-0.39,0.54}	{-0.44,0.7}	0.0041	1.0214	0.2899	1.0222
250	75th-90th	{-0.16,0.17}	{-0.2,0.23}	{-0.24,0.29}	0.0019	1.0096	0.1317	1.0111
1,000	75th-90th	{-0.084,0.079}	{-0.11,0.11}	{-0.13,0.13}	0.0009	1.0048	0.0652	1.0032
5,000	75th-90th	{-0.036,0.036}	{-0.047,0.049}	{-0.055,0.06}	0.0005	1.0023	0.0288	1.0022
1	90th-100th	{-1.17,2.01}	{-1.2,3.85}	{-1.24,5.87}	0.0494	1.2203	2.2342	1.2314
2	90th-100th	{-1.04,1.59}	{-1.09,2.68}	{-1.13,3.93}	0.0350	1.1784	1.5536	1.1846
5	90th-100th	{-0.82,1.1}	{-0.9,1.72}	{-0.96,2.35}	0.0300	1.1251	0.9504	1.1276
25	90th-100th	{-0.45,0.54}	{-0.54,0.81}	{-0.59,1.07}	0.0427	1.0712	0.4366	1.0713
50	90th-100th	{-0.33,0.38}	{-0.4,0.53}	{-0.46,0.69}	0.0460	1.0593	0.2974	1.0639
250	90th-100th	{-0.16,0.19}	{-0.21,0.24}	{-0.24,0.3}	0.0591	1.0454	0.1498	1.0474
1,000	90th-100th	{-0.089,0.092}	{-0.11,0.12}	{-0.13,0.15}	0.0632	1.0391	0.0942	1.0373
5,000	90th-100th	{-0.038,0.043}	{-0.052,0.058}	{-0.061,0.069}	0.0391	1.0325	0.0521	1.0330

Standard Model: HCC Using CY2007 Claims

Accuracy Metrics

Group Size	R-Square	MAPE
1	13.7%	0.9746
2	13.8%	0.7831
5	19.2%	0.5710
25	30.5%	0.2845
50	55.3%	0.2078
250	81.4%	0.1000
1,000	93.8%	0.0557
5,000	96.5%	0.0305

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.19,1.36}	{-1.64,2.84}	{-2.16,4.64}	0.8977	1.0271	2.1304	1.0224
2	All	{-0.97,1.23}	{-1.25,2.2}	{-1.54,3.37}	0.6213	0.9990	1.4607	0.9970
5	All	{-0.74,0.92}	{-0.92,1.47}	{-1.1,2.12}	0.4893	1.0148	0.9676	1.0117
25	All	{-0.41,0.47}	{-0.5,0.69}	{-0.58,0.93}	0.2922	0.9864	0.4620	0.9883
50	All	{-0.31,0.35}	{-0.38,0.5}	{-0.44,0.64}	0.3485	0.9925	0.4130	0.9925
250	All	{-0.15,0.17}	{-0.19,0.22}	{-0.23,0.27}	0.3074	0.9926	0.2977	0.9941
1,000	All	{-0.083,0.089}	{-0.11,0.11}	{-0.14,0.14}	0.3319	1.0010	0.2987	1.0010
5,000	All	{-0.042,0.049}	{-0.059,0.066}	{-0.088,0.082}	0.2715	0.9955	0.2405	0.9959
1	0-75th	{-0.74,1.01}	{-0.87,2.19}	{-0.98,3.63}	0.2825	0.6326	1.4252	0.6775
2	0-75th	{-0.7,1.04}	{-0.82,1.87}	{-0.92,2.83}	0.2607	0.7177	1.0944	0.7508
5	0-75th	{-0.6,0.84}	{-0.7,1.32}	{-0.78,1.87}	0.2234	0.8039	0.7586	0.8280
25	0-75th	{-0.37,0.45}	{-0.44,0.66}	{-0.5,0.87}	0.1858	0.8789	0.3892	0.8939
50	0-75th	{-0.28,0.34}	{-0.34,0.48}	{-0.4,0.62}	0.1828	0.8928	0.3001	0.9055
250	0-75th	{-0.14,0.17}	{-0.17,0.22}	{-0.2,0.27}	0.1714	0.9197	0.1901	0.9316
1,000	0-75th	{-0.071,0.092}	{-0.093,0.12}	{-0.11,0.14}	0.1698	0.9309	0.1607	0.9403
5,000	0-75th	{-0.033,0.054}	{-0.043,0.072}	{-0.052,0.086}	0.1487	0.9354	0.1331	0.9435
1	75th-90th	{-1.49,2.11}	{-1.62,3.81}	{-1.73,5.79}	0.2151	1.5952	2.3558	1.5028
2	75th-90th	{-1.24,1.62}	{-1.35,2.72}	{-1.44,4.06}	0.1455	1.4785	1.6439	1.4013
5	75th-90th	{-0.95,1.1}	{-1.06,1.77}	{-1.13,2.63}	0.0969	1.3544	1.0454	1.3024
25	75th-90th	{-0.48,0.52}	{-0.57,0.77}	{-0.63,1.04}	0.0415	1.1742	0.4303	1.1477
50	75th-90th	{-0.34,0.37}	{-0.41,0.54}	{-0.47,0.67}	0.0275	1.1209	0.2919	1.1042
250	75th-90th	{-0.16,0.15}	{-0.2,0.21}	{-0.23,0.25}	0.0119	1.0555	0.1256	1.0441
1,000	75th-90th	{-0.081,0.077}	{-0.1,0.1}	{-0.12,0.12}	0.0064	1.0290	0.0619	1.0250
5,000	75th-90th	{-0.039,0.038}	{-0.048,0.049}	{-0.056,0.059}	0.0032	1.0131	0.0297	1.0122
1	90th-100th	{-2.93,3.46}	{-3.54,6.29}	{-4.22,9.62}	1.1448	3.1308	4.1351	2.8867
2	90th-100th	{-1.94,2.33}	{-2.29,4.01}	{-2.66,6.08}	0.6677	2.3903	2.4624	2.2382
5	90th-100th	{-1.35,1.41}	{-1.6,2.28}	{-1.89,3.27}	0.5913	2.0870	1.4633	1.9527
25	90th-100th	{-0.6,0.6}	{-0.72,0.87}	{-0.84,1.26}	0.4211	1.5112	0.6300	1.4565
50	90th-100th	{-0.47,0.4}	{-0.6,0.61}	{-0.73,0.74}	0.7455	1.5474	0.7695	1.4772
250	90th-100th	{-0.26,0.14}	{-0.34,0.22}	{-0.43,0.27}	0.6882	1.4452	0.6356	1.3876
1,000	90th-100th	{-0.23,0.056}	{-0.31,0.093}	{-0.37,0.12}	0.7832	1.4848	0.6989	1.4206
5,000	90th-100th	{-0.17,0.019}	{-0.21,0.033}	{-0.26,0.043}	0.6034	1.4200	0.5368	1.3636

Lag: HCC Using CY2006-7 Less CY07 Q4

Accuracy Metrics

Group Size	R-Square	MAPE
1	9.9%	0.9763
2	12.3%	0.7946
5	12.8%	0.5728
25	31.5%	0.2921
50	45.9%	0.2142
250	78.0%	0.1051
1,000	89.0%	0.0582
5,000	93.1%	0.0331

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.19,1.37}	{-1.63,2.85}	{-2.14,4.69}	0.8192	1.0037	2.0818	1.0034
2	All	{-0.97,1.25}	{-1.28,2.23}	{-1.61,3.39}	0.6451	0.9966	1.4771	0.9961
5	All	{-0.74,0.94}	{-0.92,1.51}	{-1.08,2.16}	0.4166	0.9879	0.9333	0.9901
25	All	{-0.42,0.48}	{-0.51,0.71}	{-0.59,0.94}	0.3365	0.9932	0.4779	0.9930
50	All	{-0.31,0.36}	{-0.39,0.5}	{-0.45,0.66}	0.3207	0.9922	0.3859	0.9955
250	All	{-0.16,0.17}	{-0.2,0.22}	{-0.25,0.26}	0.3319	1.0056	0.2981	1.0043
1,000	All	{-0.084,0.092}	{-0.11,0.12}	{-0.15,0.14}	0.2967	1.0048	0.2507	1.0045
5,000	All	{-0.04,0.054}	{-0.059,0.079}	{-0.1,0.098}	0.2470	0.9945	0.2044	0.9958
1	0-75th	{-0.73,1.08}	{-0.86,2.31}	{-0.96,3.84}	0.2714	0.6346	1.5180	0.7044
2	0-75th	{-0.69,1.09}	{-0.81,1.95}	{-0.9,2.92}	0.2534	0.7097	1.1206	0.7609
5	0-75th	{-0.61,0.87}	{-0.7,1.37}	{-0.79,1.94}	0.2272	0.7995	0.7794	0.8355
25	0-75th	{-0.37,0.47}	{-0.45,0.68}	{-0.51,0.9}	0.1816	0.8752	0.3947	0.8965
50	0-75th	{-0.28,0.36}	{-0.35,0.49}	{-0.4,0.64}	0.1769	0.8971	0.3021	0.9166
250	0-75th	{-0.14,0.17}	{-0.18,0.22}	{-0.21,0.27}	0.1589	0.9270	0.1793	0.9400
1,000	0-75th	{-0.071,0.097}	{-0.09,0.12}	{-0.11,0.15}	0.1453	0.9369	0.1359	0.9486
5,000	0-75th	{-0.031,0.063}	{-0.041,0.087}	{-0.051,0.1}	0.1438	0.9381	0.1230	0.9493
1	75th-90th	{-1.48,2.07}	{-1.6,3.82}	{-1.69,5.75}	0.2081	1.5594	2.3185	1.4563
2	75th-90th	{-1.25,1.59}	{-1.36,2.71}	{-1.45,3.98}	0.1611	1.4633	1.6266	1.3744
5	75th-90th	{-0.95,1.11}	{-1.05,1.76}	{-1.12,2.5}	0.0888	1.3411	1.0222	1.2816
25	75th-90th	{-0.49,0.52}	{-0.57,0.78}	{-0.63,1.05}	0.0404	1.1651	0.4310	1.1397
50	75th-90th	{-0.35,0.37}	{-0.42,0.52}	{-0.48,0.7}	0.0284	1.1237	0.2976	1.1059
250	75th-90th	{-0.17,0.17}	{-0.2,0.22}	{-0.24,0.27}	0.0125	1.0568	0.1305	1.0466
1,000	75th-90th	{-0.087,0.077}	{-0.11,0.1}	{-0.13,0.13}	0.0076	1.0302	0.0637	1.0246
5,000	75th-90th	{-0.037,0.034}	{-0.048,0.045}	{-0.056,0.053}	0.0032	1.0134	0.0282	1.0111
1	90th-100th	{-2.84,2.97}	{-3.41,5.61}	{-3.89,8.78}	0.9330	2.9364	3.8167	2.5651
2	90th-100th	{-2.05,2.2}	{-2.39,3.87}	{-2.77,5.83}	0.7711	2.4465	2.5241	2.1914
5	90th-100th	{-1.3,1.32}	{-1.47,2.15}	{-1.63,3.15}	0.3279	1.8686	1.3270	1.7100
25	90th-100th	{-0.66,0.52}	{-0.83,0.81}	{-1.03,1.11}	0.5828	1.6210	0.6928	1.4973
50	90th-100th	{-0.48,0.38}	{-0.59,0.57}	{-0.74,0.73}	0.6579	1.5079	0.6522	1.4213
250	90th-100th	{-0.32,0.13}	{-0.48,0.19}	{-0.65,0.23}	0.7740	1.5186	0.6427	1.4232
1,000	90th-100th	{-0.26,0.058}	{-0.38,0.085}	{-0.49,0.11}	0.6817	1.4758	0.5557	1.3937
5,000	90th-100th	{-0.19,0.02}	{-0.3,0.035}	{-0.36,0.048}	0.5242	1.3893	0.4252	1.3212

Lag: HCC Using CY2006-7 Less CY07 Q3 & Q4

Accuracy Metrics

Group Size	R-Square	MAPE
1	8.9%	0.9686
2	9.9%	0.7941
5	14.3%	0.5878
25	34.8%	0.2975
50	42.3%	0.2140
250	75.3%	0.1060
1,000	86.3%	0.0621
5,000	90.6%	0.0362

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.18,1.37}	{-1.6,2.84}	{-2.1,4.67}	0.8078	0.9864	2.0474	0.9876
2	All	{-0.98,1.26}	{-1.28,2.25}	{-1.59,3.38}	0.6012	0.9895	1.4419	0.9880
5	All	{-0.76,0.96}	{-0.95,1.52}	{-1.13,2.18}	0.4697	1.0196	0.9615	1.0167
25	All	{-0.43,0.48}	{-0.53,0.7}	{-0.62,0.95}	0.4001	1.0149	0.5032	1.0108
50	All	{-0.32,0.36}	{-0.39,0.5}	{-0.46,0.65}	0.3111	0.9907	0.3726	0.9931
250	All	{-0.16,0.17}	{-0.2,0.22}	{-0.25,0.28}	0.3254	1.0009	0.2881	1.0017
1,000	All	{-0.084,0.1}	{-0.11,0.13}	{-0.15,0.15}	0.3146	1.0007	0.2552	1.0012
5,000	All	{-0.041,0.055}	{-0.058,0.083}	{-0.12,0.11}	0.2787	0.9986	0.2204	0.9984
1	0-75th	{-0.73,1.09}	{-0.86,2.32}	{-0.96,3.87}	0.2677	0.6255	1.5247	0.7032
2	0-75th	{-0.7,1.11}	{-0.81,2}	{-0.9,2.99}	0.2526	0.7146	1.1401	0.7732
5	0-75th	{-0.61,0.9}	{-0.71,1.4}	{-0.8,1.98}	0.2199	0.8149	0.7920	0.8551
25	0-75th	{-0.37,0.48}	{-0.44,0.69}	{-0.51,0.93}	0.1766	0.8845	0.3947	0.9123
50	0-75th	{-0.28,0.35}	{-0.35,0.49}	{-0.4,0.64}	0.1716	0.8992	0.2957	0.9197
250	0-75th	{-0.14,0.18}	{-0.17,0.23}	{-0.21,0.28}	0.1622	0.9252	0.1802	0.9412
1,000	0-75th	{-0.072,0.11}	{-0.091,0.14}	{-0.11,0.16}	0.1627	0.9337	0.1468	0.9480
5,000	0-75th	{-0.032,0.065}	{-0.042,0.096}	{-0.05,0.12}	0.1490	0.9383	0.1247	0.9504
1	75th-90th	{-1.45,2.05}	{-1.57,3.78}	{-1.65,5.72}	0.1937	1.5299	2.3290	1.4382
2	75th-90th	{-1.24,1.59}	{-1.36,2.72}	{-1.45,3.96}	0.1588	1.4591	1.6249	1.3632
5	75th-90th	{-0.97,1.09}	{-1.07,1.72}	{-1.14,2.51}	0.0957	1.3617	1.0243	1.2871
25	75th-90th	{-0.5,0.47}	{-0.59,0.71}	{-0.65,0.98}	0.0411	1.1711	0.4182	1.1199
50	75th-90th	{-0.36,0.37}	{-0.43,0.55}	{-0.48,0.69}	0.0276	1.1186	0.2975	1.0966
250	75th-90th	{-0.17,0.16}	{-0.2,0.22}	{-0.24,0.28}	0.0123	1.0556	0.1307	1.0468
1,000	75th-90th	{-0.086,0.079}	{-0.11,0.1}	{-0.12,0.13}	0.0062	1.0275	0.0639	1.0212
5,000	75th-90th	{-0.037,0.033}	{-0.048,0.044}	{-0.057,0.052}	0.0031	1.0133	0.0276	1.0105
1	90th-100th	{-2.86,2.85}	{-3.46,5.32}	{-3.97,8.32}	0.9689	2.8764	3.6484	2.4429
2	90th-100th	{-2,2}	{-2.31,3.52}	{-2.67,5.39}	0.5965	2.3482	2.3297	2.0371
5	90th-100th	{-1.4,1.31}	{-1.63,2.16}	{-1.87,3.2}	0.5431	2.0413	1.4180	1.8233
25	90th-100th	{-0.75,0.51}	{-1,0.8}	{-1.28,1.1}	0.8041	1.7590	0.8249	1.5857
50	90th-100th	{-0.48,0.36}	{-0.58,0.53}	{-0.74,0.67}	0.6436	1.4843	0.6225	1.3876
250	90th-100th	{-0.34,0.13}	{-0.49,0.19}	{-0.68,0.25}	0.7607	1.4861	0.6175	1.3878
1,000	90th-100th	{-0.33,0.065}	{-0.49,0.098}	{-0.61,0.12}	0.7373	1.4624	0.5709	1.3700
5,000	90th-100th	{-0.27,0.024}	{-0.41,0.04}	{-0.5,0.051}	0.6309	1.4287	0.4837	1.3402

Eligibility: HCC Using CY2007 Q2-4; 9 Months

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.8%	0.9482
2	13.2%	0.7832
5	16.5%	0.5595
25	47.1%	0.2857
50	51.2%	0.2074
250	83.2%	0.0999
1,000	92.8%	0.0540
5,000	97.1%	0.0283

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.13,1.34}	{-1.55,2.79}	{-2.03,4.59}	0.8159	0.9872	2.0523	0.9910
2	All	{-0.96,1.23}	{-1.24,2.2}	{-1.52,3.33}	0.5963	1.0002	1.4466	0.9943
5	All	{-0.71,0.91}	{-0.88,1.47}	{-1.03,2.1}	0.4176	0.9780	0.9351	0.9802
25	All	{-0.41,0.48}	{-0.49,0.7}	{-0.57,0.95}	0.4144	0.9950	0.5383	0.9966
50	All	{-0.31,0.35}	{-0.38,0.49}	{-0.44,0.65}	0.3200	0.9883	0.3930	0.9891
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.24,0.27}	0.3240	1.0072	0.3150	1.0066
1,000	All	{-0.082,0.087}	{-0.11,0.11}	{-0.13,0.13}	0.2877	0.9972	0.2641	0.9972
5,000	All	{-0.04,0.046}	{-0.055,0.062}	{-0.081,0.079}	0.2611	0.9945	0.2363	0.9951
1	0-75th	{-0.72,1}	{-0.84,2.16}	{-0.94,3.6}	0.2621	0.6224	1.4215	0.6689
2	0-75th	{-0.71,1.05}	{-0.82,1.88}	{-0.91,2.81}	0.2522	0.7276	1.0997	0.7556
5	0-75th	{-0.59,0.83}	{-0.69,1.32}	{-0.77,1.87}	0.2131	0.7960	0.7515	0.8172
25	0-75th	{-0.37,0.45}	{-0.44,0.66}	{-0.5,0.88}	0.1848	0.8742	0.3900	0.8877
50	0-75th	{-0.28,0.34}	{-0.34,0.48}	{-0.39,0.64}	0.1675	0.8950	0.2973	0.9076
250	0-75th	{-0.14,0.16}	{-0.17,0.22}	{-0.2,0.27}	0.1587	0.9283	0.1850	0.9371
1,000	0-75th	{-0.072,0.09}	{-0.092,0.11}	{-0.11,0.14}	0.1529	0.9343	0.1488	0.9418
5,000	0-75th	{-0.032,0.05}	{-0.043,0.069}	{-0.052,0.084}	0.1442	0.9386	0.1308	0.9459
1	75th-90th	{-1.43,2.04}	{-1.55,3.72}	{-1.66,5.62}	0.2099	1.5208	2.2870	1.4387
2	75th-90th	{-1.23,1.6}	{-1.34,2.72}	{-1.43,3.96}	0.1533	1.4650	1.6144	1.3866
5	75th-90th	{-0.92,1.07}	{-1.02,1.73}	{-1.08,2.46}	0.0860	1.3045	1.0012	1.2564
25	75th-90th	{-0.47,0.52}	{-0.56,0.79}	{-0.63,1.06}	0.0375	1.1559	0.4324	1.1420
50	75th-90th	{-0.35,0.37}	{-0.41,0.52}	{-0.46,0.68}	0.0268	1.1138	0.2908	1.0994
250	75th-90th	{-0.16,0.16}	{-0.2,0.22}	{-0.23,0.27}	0.0126	1.0566	0.1296	1.0521
1,000	75th-90th	{-0.083,0.079}	{-0.1,0.1}	{-0.12,0.12}	0.0066	1.0289	0.0626	1.0263
5,000	75th-90th	{-0.038,0.029}	{-0.045,0.042}	{-0.053,0.052}	0.0033	1.0133	0.0265	1.0100
1	90th-100th	{-2.74,3.43}	{-3.24,6.14}	{-3.77,9.21}	0.9619	2.9159	3.8709	2.7297
2	90th-100th	{-1.91,2.29}	{-2.22,3.85}	{-2.54,5.68}	0.5927	2.3460	2.4181	2.1946
5	90th-100th	{-1.24,1.43}	{-1.42,2.32}	{-1.61,3.48}	0.4646	1.8545	1.4272	1.7890
25	90th-100th	{-0.61,0.61}	{-0.77,0.91}	{-1,1.21}	0.9320	1.6597	0.9986	1.5954
50	90th-100th	{-0.45,0.38}	{-0.54,0.53}	{-0.67,0.73}	0.6796	1.5000	0.6991	1.4345
250	90th-100th	{-0.26,0.14}	{-0.36,0.2}	{-0.44,0.26}	0.7372	1.5241	0.6823	1.4604
1,000	90th-100th	{-0.18,0.065}	{-0.23,0.093}	{-0.3,0.11}	0.6644	1.4212	0.6024	1.3693
5,000	90th-100th	{-0.13,0.024}	{-0.17,0.035}	{-0.22,0.045}	0.5910	1.3855	0.5391	1.3414

Eligibility: HCC Using CY2007 Q3-4; 6 Months

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.2%	0.9660
2	12.7%	0.7944
5	18.0%	0.5718
25	43.4%	0.2914
50	49.9%	0.2097
250	79.9%	0.0990
1,000	93.1%	0.0533
5,000	97.0%	0.0279

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.12,1.37}	{-1.53,2.83}	{-1.98,4.64}	0.7868	1.0024	2.0714	1.0028
2	All	{-0.95,1.26}	{-1.2,2.25}	{-1.47,3.39}	0.5677	1.0050	1.4722	1.0088
5	All	{-0.73,0.93}	{-0.89,1.5}	{-1.06,2.15}	0.4474	1.0070	0.9606	1.0059
25	All	{-0.42,0.48}	{-0.51,0.7}	{-0.58,0.96}	0.3792	1.0228	0.5308	1.0229
50	All	{-0.31,0.35}	{-0.38,0.5}	{-0.44,0.66}	0.2987	0.9954	0.3935	0.9972
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.23,0.27}	0.2790	0.9980	0.2824	0.9984
1,000	All	{-0.083,0.085}	{-0.11,0.11}	{-0.13,0.13}	0.2769	0.9945	0.2608	0.9946
5,000	All	{-0.042,0.043}	{-0.058,0.058}	{-0.086,0.072}	0.2403	1.0015	0.2200	1.0009
1	0-75th	{-0.74,1.03}	{-0.86,2.22}	{-0.94,3.7}	0.2482	0.6536	1.4585	0.6874
2	0-75th	{-0.72,1.07}	{-0.83,1.93}	{-0.91,2.87}	0.2417	0.7465	1.1238	0.7717
5	0-75th	{-0.61,0.85}	{-0.7,1.34}	{-0.78,1.89}	0.2113	0.8136	0.7733	0.8303
25	0-75th	{-0.37,0.46}	{-0.45,0.67}	{-0.51,0.91}	0.1630	0.9008	0.3948	0.9127
50	0-75th	{-0.29,0.34}	{-0.35,0.48}	{-0.4,0.64}	0.1678	0.9050	0.2998	0.9137
250	0-75th	{-0.14,0.16}	{-0.18,0.22}	{-0.21,0.26}	0.1527	0.9293	0.1826	0.9363
1,000	0-75th	{-0.074,0.088}	{-0.096,0.11}	{-0.11,0.14}	0.1568	0.9352	0.1534	0.9411
5,000	0-75th	{-0.034,0.046}	{-0.044,0.061}	{-0.054,0.077}	0.1329	0.9450	0.1229	0.9503
1	75th-90th	{-1.41,2.02}	{-1.53,3.74}	{-1.63,5.71}	0.2038	1.5024	2.3028	1.4343
2	75th-90th	{-1.21,1.64}	{-1.31,2.74}	{-1.39,4.02}	0.1309	1.4438	1.6961	1.4013
5	75th-90th	{-0.93,1.13}	{-1.03,1.8}	{-1.1,2.51}	0.0920	1.3343	1.0195	1.3015
25	75th-90th	{-0.48,0.52}	{-0.57,0.76}	{-0.64,1.06}	0.0441	1.1784	0.4303	1.1598
50	75th-90th	{-0.34,0.38}	{-0.42,0.54}	{-0.47,0.7}	0.0279	1.1206	0.3015	1.1071
250	75th-90th	{-0.16,0.16}	{-0.19,0.22}	{-0.23,0.27}	0.0120	1.0527	0.1270	1.0505
1,000	75th-90th	{-0.079,0.078}	{-0.1,0.1}	{-0.12,0.13}	0.0056	1.0253	0.0629	1.0233
5,000	75th-90th	{-0.037,0.035}	{-0.044,0.047}	{-0.052,0.056}	0.0031	1.0131	0.0283	1.0123
1	90th-100th	{-2.67,3.36}	{-3.18,6.01}	{-3.68,9.17}	0.9524	2.8652	3.8750	2.7183
2	90th-100th	{-1.84,2.35}	{-2.14,3.95}	{-2.46,5.89}	0.5718	2.2880	2.4134	2.2002
5	90th-100th	{-1.28,1.41}	{-1.48,2.32}	{-1.69,3.31}	0.5425	1.9655	1.4346	1.8789
25	90th-100th	{-0.62,0.59}	{-0.76,0.9}	{-0.88,1.3}	0.7894	1.7046	0.9303	1.6445
50	90th-100th	{-0.42,0.41}	{-0.52,0.59}	{-0.62,0.78}	0.5962	1.4851	0.6744	1.4584
250	90th-100th	{-0.24,0.15}	{-0.31,0.21}	{-0.38,0.27}	0.6130	1.4313	0.5834	1.3859
1,000	90th-100th	{-0.16,0.067}	{-0.21,0.097}	{-0.28,0.12}	0.6295	1.3929	0.5885	1.3535
5,000	90th-100th	{-0.12,0.018}	{-0.14,0.03}	{-0.17,0.045}	0.5059	1.4077	0.4676	1.3637

Eligibility: HCC Using CY2007 Q4; 3 Months

Accuracy Metrics

Group Size	R-Square	MAPE
1	11.6%	0.9846
2	12.7%	0.7879
5	16.7%	0.5717
25	37.9%	0.2900
50	53.2%	0.2109
250	79.8%	0.0995
1,000	94.4%	0.0529
5,000	97.5%	0.0273

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.12,1.4}	{-1.49,2.89}	{-1.89,4.73}	0.7395	1.0145	2.0921	1.0144
2	All	{-0.92,1.23}	{-1.16,2.22}	{-1.41,3.39}	0.5530	0.9874	1.4665	0.9872
5	All	{-0.72,0.94}	{-0.87,1.51}	{-1.01,2.16}	0.4053	0.9983	0.9493	0.9988
25	All	{-0.42,0.47}	{-0.5,0.69}	{-0.57,0.92}	0.3214	1.0087	0.4953	1.0030
50	All	{-0.31,0.35}	{-0.38,0.5}	{-0.44,0.66}	0.3137	0.9978	0.4070	0.9989
250	All	{-0.15,0.16}	{-0.19,0.22}	{-0.23,0.27}	0.2669	0.9946	0.2834	0.9961
1,000	All	{-0.08,0.085}	{-0.1,0.11}	{-0.13,0.14}	0.2897	1.0068	0.2878	1.0070
5,000	All	{-0.04,0.043}	{-0.055,0.057}	{-0.077,0.071}	0.2456	1.0003	0.2357	1.0008
1	0-75th	{-0.78,1.05}	{-0.9,2.27}	{-0.98,3.81}	0.2441	0.6886	1.5062	0.7076
2	0-75th	{-0.71,1.03}	{-0.82,1.88}	{-0.9,2.85}	0.2240	0.7431	1.1273	0.7558
5	0-75th	{-0.62,0.84}	{-0.71,1.34}	{-0.78,1.91}	0.1927	0.8254	0.7767	0.8339
25	0-75th	{-0.39,0.45}	{-0.46,0.65}	{-0.51,0.85}	0.1509	0.9030	0.3842	0.9028
50	0-75th	{-0.29,0.34}	{-0.35,0.48}	{-0.4,0.63}	0.1503	0.9082	0.2922	0.9146
250	0-75th	{-0.14,0.16}	{-0.18,0.22}	{-0.21,0.27}	0.1481	0.9304	0.1812	0.9348
1,000	0-75th	{-0.075,0.087}	{-0.095,0.11}	{-0.11,0.14}	0.1284	0.9458	0.1353	0.9496
5,000	0-75th	{-0.036,0.045}	{-0.047,0.06}	{-0.058,0.077}	0.1267	0.9478	0.1204	0.9518
1	75th-90th	{-1.4,2.04}	{-1.52,3.72}	{-1.61,5.62}	0.1951	1.4930	2.3425	1.4342
2	75th-90th	{-1.16,1.63}	{-1.25,2.79}	{-1.32,4.06}	0.1210	1.3768	1.6394	1.3525
5	75th-90th	{-0.91,1.14}	{-1,1.8}	{-1.07,2.53}	0.0861	1.2950	1.0117	1.2802
25	75th-90th	{-0.47,0.52}	{-0.56,0.74}	{-0.61,1.01}	0.0350	1.1529	0.4223	1.1411
50	75th-90th	{-0.34,0.37}	{-0.41,0.52}	{-0.46,0.68}	0.0241	1.1028	0.2919	1.0987
250	75th-90th	{-0.16,0.17}	{-0.2,0.23}	{-0.23,0.27}	0.0109	1.0483	0.1323	1.0499
1,000	75th-90th	{-0.081,0.076}	{-0.1,0.1}	{-0.12,0.13}	0.0062	1.0262	0.0652	1.0227
5,000	75th-90th	{-0.035,0.034}	{-0.043,0.048}	{-0.051,0.057}	0.0030	1.0119	0.0281	1.0119
1	90th-100th	{-2.47,3.49}	{-2.98,6.13}	{-3.52,9.16}	0.9121	2.7448	3.8426	2.6884
2	90th-100th	{-1.8,2.37}	{-2.1,3.9}	{-2.4,5.8}	0.6504	2.2373	2.4356	2.1762
5	90th-100th	{-1.19,1.45}	{-1.36,2.28}	{-1.52,3.34}	0.5215	1.8488	1.4013	1.8127
25	90th-100th	{-0.59,0.64}	{-0.72,0.96}	{-0.86,1.35}	0.6431	1.5850	0.8239	1.5470
50	90th-100th	{-0.42,0.42}	{-0.53,0.61}	{-0.65,0.84}	0.6877	1.5119	0.7660	1.4818
250	90th-100th	{-0.21,0.18}	{-0.28,0.24}	{-0.34,0.3}	0.5933	1.3962	0.5953	1.3760
1,000	90th-100th	{-0.13,0.085}	{-0.17,0.12}	{-0.22,0.15}	0.7097	1.4355	0.7027	1.4144
5,000	90th-100th	{-0.097,0.034}	{-0.13,0.049}	{-0.14,0.06}	0.5664	1.3765	0.5517	1.3516

Turnover: HCC Using CY2007 (10% New Mbrs)

Accuracy Metrics

Group Size	R-Square	MAPE
1	11.1%	0.9703
2	11.4%	0.7834
5	15.1%	0.5646
25	44.0%	0.2903
50	45.9%	0.2118
250	76.3%	0.1010
1,000	93.3%	0.0554
5,000	96.3%	0.0293

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.12,1.37}	{-1.53,2.85}	{-2.01,4.65}	0.7850	1.0015	2.0643	1.0007
2	All	{-0.94,1.24}	{-1.2,2.21}	{-1.48,3.35}	0.5586	0.9792	1.4431	0.9813
5	All	{-0.72,0.92}	{-0.88,1.48}	{-1.03,2.12}	0.4137	0.9798	0.9332	0.9824
25	All	{-0.42,0.48}	{-0.51,0.71}	{-0.59,0.93}	0.3921	1.0103	0.5220	1.0095
50	All	{-0.31,0.35}	{-0.38,0.51}	{-0.45,0.66}	0.2961	0.9983	0.3793	0.9995
250	All	{-0.16,0.17}	{-0.2,0.22}	{-0.23,0.27}	0.2696	0.9933	0.2661	0.9930
1,000	All	{-0.083,0.089}	{-0.11,0.11}	{-0.14,0.14}	0.3113	1.0002	0.2835	1.0001
5,000	All	{-0.041,0.045}	{-0.056,0.062}	{-0.079,0.079}	0.2513	0.9972	0.2229	0.9975
1	0-75th	{-0.78,1.06}	{-0.89,2.27}	{-0.98,3.78}	0.2716	0.6574	1.4904	0.7002
2	0-75th	{-0.7,1.07}	{-0.81,1.92}	{-0.89,2.89}	0.2369	0.7250	1.1281	0.7609
5	0-75th	{-0.6,0.84}	{-0.7,1.34}	{-0.77,1.88}	0.2146	0.8020	0.7653	0.8242
25	0-75th	{-0.37,0.47}	{-0.45,0.67}	{-0.51,0.88}	0.1609	0.8923	0.3832	0.9081
50	0-75th	{-0.28,0.34}	{-0.35,0.49}	{-0.4,0.64}	0.1605	0.9076	0.2950	0.9199
250	0-75th	{-0.14,0.17}	{-0.18,0.22}	{-0.21,0.27}	0.1619	0.9268	0.1855	0.9348
1,000	0-75th	{-0.073,0.094}	{-0.093,0.12}	{-0.11,0.14}	0.1602	0.9361	0.1546	0.9444
5,000	0-75th	{-0.032,0.05}	{-0.043,0.068}	{-0.051,0.09}	0.1384	0.9430	0.1234	0.9504
1	75th-90th	{-1.38,2.02}	{-1.52,3.73}	{-1.62,5.61}	0.2171	1.4666	2.2673	1.3961
2	75th-90th	{-1.18,1.6}	{-1.29,2.7}	{-1.37,3.94}	0.1414	1.4029	1.6124	1.3404
5	75th-90th	{-0.91,1.13}	{-1,1.75}	{-1.08,2.52}	0.0852	1.2908	1.0096	1.2606
25	75th-90th	{-0.48,0.51}	{-0.56,0.77}	{-0.63,1.04}	0.0375	1.1604	0.4238	1.1371
50	75th-90th	{-0.34,0.37}	{-0.41,0.53}	{-0.46,0.7}	0.0272	1.1156	0.2935	1.1014
250	75th-90th	{-0.16,0.17}	{-0.2,0.22}	{-0.23,0.27}	0.0122	1.0531	0.1272	1.0473
1,000	75th-90th	{-0.081,0.078}	{-0.1,0.1}	{-0.11,0.13}	0.0063	1.0271	0.0622	1.0227
5,000	75th-90th	{-0.039,0.036}	{-0.048,0.046}	{-0.057,0.056}	0.0037	1.0137	0.0289	1.0117
1	90th-100th	{-2.66,3.23}	{-3.24,5.83}	{-3.8,8.88}	0.9502	2.8509	3.8136	2.6322
2	90th-100th	{-1.86,2.18}	{-2.15,3.79}	{-2.45,5.66}	0.5511	2.2492	2.3625	2.0957
5	90th-100th	{-1.24,1.38}	{-1.43,2.24}	{-1.64,3.27}	0.4674	1.8488	1.3754	1.7535
25	90th-100th	{-0.64,0.56}	{-0.8,0.85}	{-1.01,1.16}	0.8764	1.6700	0.9644	1.5783
50	90th-100th	{-0.47,0.41}	{-0.59,0.6}	{-0.7,0.74}	0.5886	1.5022	0.6292	1.4440
250	90th-100th	{-0.25,0.15}	{-0.33,0.2}	{-0.43,0.25}	0.5690	1.4026	0.5196	1.3485
1,000	90th-100th	{-0.19,0.061}	{-0.28,0.088}	{-0.36,0.12}	0.7422	1.4406	0.6684	1.3846
5,000	90th-100th	{-0.14,0.022}	{-0.21,0.035}	{-0.26,0.045}	0.5653	1.3794	0.5043	1.3297

Turnover: HCC Using CY2007 (30% New Mbrs)

Accuracy Metrics

Group Size	R-Square	MAPE
1	9.3%	0.9909
2	9.3%	0.8037
5	13.4%	0.5853
25	30.4%	0.2931
50	38.5%	0.2155
250	76.1%	0.1021
1,000	91.4%	0.0547
5,000	95.4%	0.0279

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.07,1.41}	{-1.37,2.91}	{-1.85,4.76}	0.7229	0.9991	2.0687	0.9975
2	All	{-0.92,1.28}	{-1.14,2.27}	{-1.41,3.42}	0.5105	0.9870	1.4473	0.9866
5	All	{-0.73,0.96}	{-0.87,1.53}	{-1.02,2.2}	0.3962	1.0001	0.9614	1.0023
25	All	{-0.42,0.48}	{-0.5,0.71}	{-0.58,0.96}	0.3061	1.0014	0.4754	1.0007
50	All	{-0.31,0.35}	{-0.38,0.51}	{-0.44,0.66}	0.2603	1.0058	0.3607	1.0073
250	All	{-0.16,0.17}	{-0.2,0.22}	{-0.23,0.27}	0.2648	0.9999	0.2660	0.9998
1,000	All	{-0.083,0.088}	{-0.11,0.11}	{-0.13,0.14}	0.2684	1.0029	0.2458	1.0023
5,000	All	{-0.04,0.044}	{-0.054,0.059}	{-0.071,0.076}	0.2097	0.9965	0.1859	0.9969
1	0-75th	{-0.84,1.13}	{-0.93,2.42}	{-1,4.03}	0.2685	0.7087	1.6322	0.7441
2	0-75th	{-0.74,1.13}	{-0.84,2.02}	{-0.91,3.03}	0.2220	0.7650	1.1976	0.7944
5	0-75th	{-0.63,0.89}	{-0.72,1.4}	{-0.79,2}	0.1868	0.8381	0.8077	0.8589
25	0-75th	{-0.39,0.47}	{-0.46,0.69}	{-0.52,0.93}	0.1622	0.9032	0.3971	0.9147
50	0-75th	{-0.29,0.35}	{-0.36,0.5}	{-0.41,0.65}	0.1370	0.9263	0.2932	0.9382
250	0-75th	{-0.14,0.17}	{-0.18,0.22}	{-0.21,0.27}	0.1427	0.9392	0.1751	0.9468
1,000	0-75th	{-0.075,0.09}	{-0.096,0.11}	{-0.12,0.14}	0.1328	0.9492	0.1324	0.9545
5,000	0-75th	{-0.033,0.047}	{-0.044,0.063}	{-0.053,0.083}	0.1247	0.9527	0.1126	0.9587
1	75th-90th	{-1.23,1.92}	{-1.33,3.52}	{-1.42,5.35}	0.1593	1.3137	2.1068	1.2703
2	75th-90th	{-1.12,1.57}	{-1.22,2.64}	{-1.3,3.9}	0.1360	1.3214	1.5610	1.2757
5	75th-90th	{-0.9,1.07}	{-0.99,1.73}	{-1.06,2.48}	0.0787	1.2606	0.9958	1.2252
25	75th-90th	{-0.46,0.53}	{-0.54,0.78}	{-0.62,1.08}	0.0339	1.1451	0.4354	1.1380
50	75th-90th	{-0.35,0.35}	{-0.41,0.52}	{-0.47,0.72}	0.0234	1.1082	0.3006	1.0929
250	75th-90th	{-0.17,0.16}	{-0.21,0.21}	{-0.23,0.26}	0.0109	1.0483	0.1286	1.0391
1,000	75th-90th	{-0.082,0.088}	{-0.1,0.12}	{-0.12,0.14}	0.0060	1.0257	0.0669	1.0264
5,000	75th-90th	{-0.037,0.036}	{-0.049,0.048}	{-0.057,0.057}	0.0040	1.0134	0.0292	1.0118
1	90th-100th	{-2.55,2.99}	{-3.09,5.51}	{-3.68,8.48}	1.0455	2.6658	3.6511	2.4551
2	90th-100th	{-1.79,2.11}	{-2.07,3.63}	{-2.38,5.42}	0.5489	2.1578	2.2624	2.0010
5	90th-100th	{-1.21,1.36}	{-1.4,2.26}	{-1.63,3.42}	0.5659	1.8248	1.4438	1.7433
25	90th-100th	{-0.6,0.51}	{-0.72,0.79}	{-0.84,1.11}	0.6046	1.5201	0.7193	1.4389
50	90th-100th	{-0.45,0.39}	{-0.56,0.57}	{-0.69,0.72}	0.5266	1.4483	0.5680	1.3967
250	90th-100th	{-0.24,0.15}	{-0.3,0.22}	{-0.38,0.26}	0.6087	1.3829	0.5613	1.3379
1,000	90th-100th	{-0.18,0.069}	{-0.25,0.1}	{-0.31,0.12}	0.6556	1.3717	0.5865	1.3249
5,000	90th-100th	{-0.12,0.027}	{-0.18,0.04}	{-0.25,0.051}	0.4652	1.2998	0.4103	1.2610

Data Quality: HCC Using CY2007 (Ignore Inpatient Dx)

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.33%	0.9529
2	13.5%	0.7823
5	18.8%	0.5693
25	32.5%	0.2869
50	57.2%	0.2109
250	85.2%	0.0999
1,000	93.3%	0.0552
5,000	96.6%	0.0301

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.16,1.34}	{-1.59,2.8}	{-2.05,4.63}	0.8124	0.9939	2.0507	0.9945
2	All	{-0.96,1.23}	{-1.25,2.22}	{-1.55,3.34}	0.6202	0.9909	1.4715	0.9931
5	All	{-0.73,0.92}	{-0.9,1.48}	{-1.08,2.13}	0.4772	1.0060	0.9670	1.0060
25	All	{-0.41,0.48}	{-0.5,0.69}	{-0.58,0.94}	0.3061	1.0044	0.4735	1.0054
50	All	{-0.32,0.34}	{-0.39,0.48}	{-0.45,0.62}	0.3624	1.0254	0.4246	1.0206
250	All	{-0.16,0.16}	{-0.2,0.21}	{-0.23,0.26}	0.3557	1.0058	0.3385	1.0049
1,000	All	{-0.083,0.088}	{-0.11,0.11}	{-0.14,0.14}	0.3123	0.9983	0.2831	0.9989
5,000	All	{-0.04,0.049}	{-0.058,0.066}	{-0.095,0.08}	0.2692	0.9939	0.2385	0.9950
1	0-75th	{-0.73,1}	{-0.86,2.17}	{-0.96,3.65}	0.2720	0.6275	1.4254	0.6743
2	0-75th	{-0.69,1.04}	{-0.81,1.88}	{-0.9,2.81}	0.2567	0.7075	1.1026	0.7441
5	0-75th	{-0.6,0.85}	{-0.71,1.34}	{-0.79,1.89}	0.2259	0.8078	0.7656	0.8326
25	0-75th	{-0.37,0.46}	{-0.44,0.66}	{-0.5,0.87}	0.1701	0.8927	0.3873	0.9090
50	0-75th	{-0.29,0.34}	{-0.35,0.47}	{-0.4,0.59}	0.1528	0.9163	0.2893	0.9247
250	0-75th	{-0.14,0.16}	{-0.17,0.21}	{-0.2,0.26}	0.1682	0.9216	0.1900	0.9312
1,000	0-75th	{-0.071,0.093}	{-0.092,0.12}	{-0.11,0.14}	0.1684	0.9313	0.1607	0.9403
5,000	0-75th	{-0.031,0.054}	{-0.042,0.071}	{-0.051,0.084}	0.1479	0.9346	0.1325	0.9433
1	75th-90th	{-1.46,2.07}	{-1.59,3.78}	{-1.69,5.72}	0.2114	1.5570	2.2790	1.4632
2	75th-90th	{-1.24,1.65}	{-1.35,2.75}	{-1.44,4.09}	0.1509	1.4710	1.6601	1.4082
5	75th-90th	{-0.94,1.1}	{-1.04,1.75}	{-1.12,2.48}	0.0929	1.3425	1.0410	1.2997
25	75th-90th	{-0.48,0.52}	{-0.56,0.77}	{-0.64,1.06}	0.0402	1.1723	0.4345	1.1494
50	75th-90th	{-0.35,0.35}	{-0.43,0.49}	{-0.48,0.65}	0.0307	1.1349	0.2920	1.1125
250	75th-90th	{-0.16,0.16}	{-0.2,0.21}	{-0.23,0.28}	0.0130	1.0562	0.1280	1.0512
1,000	75th-90th	{-0.082,0.08}	{-0.099,0.11}	{-0.12,0.13}	0.0062	1.0276	0.0634	1.0262
5,000	75th-90th	{-0.036,0.036}	{-0.045,0.047}	{-0.054,0.056}	0.0032	1.0130	0.0282	1.0127
1	90th-100th	{-2.72,3.3}	{-3.21,5.96}	{-3.71,9.18}	0.9266	2.9020	3.8792	2.6970
2	90th-100th	{-1.97,2.32}	{-2.31,3.97}	{-2.66,5.98}	0.6322	2.3947	2.4753	2.2376
5	90th-100th	{-1.31,1.39}	{-1.5,2.28}	{-1.74,3.31}	0.6730	1.9879	1.4951	1.8668
25	90th-100th	{-0.63,0.56}	{-0.73,0.91}	{-0.85,1.19}	0.4891	1.5898	0.6897	1.5126
50	90th-100th	{-0.49,0.38}	{-0.62,0.58}	{-0.79,0.75}	0.7756	1.6798	0.7921	1.6023
250	90th-100th	{-0.29,0.13}	{-0.39,0.2}	{-0.5,0.25}	0.8293	1.5610	0.7573	1.4877
1,000	90th-100th	{-0.2,0.058}	{-0.28,0.087}	{-0.36,0.11}	0.7192	1.4571	0.6453	1.3975
5,000	90th-100th	{-0.17,0.025}	{-0.21,0.035}	{-0.26,0.044}	0.6008	1.4101	0.5346	1.3555

Data Quality: HCC Using CY2007 (Ignore Outpatient Dx)

Accuracy Metrics

Group Size	R-Square	MAPE
1	12.2%	0.9563
2	13.6%	0.7739
5	19.9%	0.5634
25	38.6%	0.2856
50	43.9%	0.2076
250	80.7%	0.0996
1,000	91.8%	0.0552
5,000	96.2%	0.0303

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.15,1.34}	{-1.6,2.79}	{-2.11,4.6}	0.8279	0.9989	2.0682	0.9999
2	All	{-0.95,1.22}	{-1.23,2.2}	{-1.52,3.29}	0.6126	0.9810	1.4487	0.9829
5	All	{-0.72,0.92}	{-0.9,1.47}	{-1.07,2.11}	0.4921	0.9916	0.9660	0.9928
25	All	{-0.41,0.47}	{-0.5,0.69}	{-0.59,0.94}	0.3496	0.9998	0.4940	0.9992
50	All	{-0.31,0.34}	{-0.38,0.49}	{-0.44,0.63}	0.2879	0.9910	0.3656	0.9884
250	All	{-0.15,0.16}	{-0.2,0.21}	{-0.23,0.26}	0.3009	0.9986	0.2925	0.9976
1,000	All	{-0.083,0.087}	{-0.11,0.11}	{-0.14,0.14}	0.2807	0.9971	0.2538	0.9976
5,000	All	{-0.042,0.047}	{-0.058,0.066}	{-0.091,0.085}	0.2612	0.9955	0.2297	0.9960
1	0-75th	{-0.72,1.01}	{-0.84,2.18}	{-0.94,3.64}	0.2622	0.6262	1.4395	0.6769
2	0-75th	{-0.69,1.04}	{-0.8,1.87}	{-0.89,2.79}	0.2514	0.7047	1.0805	0.7423
5	0-75th	{-0.59,0.83}	{-0.69,1.32}	{-0.77,1.85}	0.2211	0.7885	0.7511	0.8153
25	0-75th	{-0.37,0.45}	{-0.44,0.65}	{-0.5,0.88}	0.1707	0.8862	0.3840	0.9011
50	0-75th	{-0.28,0.33}	{-0.35,0.46}	{-0.4,0.61}	0.1811	0.8965	0.2999	0.9063
250	0-75th	{-0.14,0.16}	{-0.18,0.21}	{-0.21,0.26}	0.1595	0.9257	0.1822	0.9345
1,000	0-75th	{-0.072,0.092}	{-0.093,0.12}	{-0.11,0.14}	0.1480	0.9343	0.1422	0.9430
5,000	0-75th	{-0.033,0.054}	{-0.044,0.074}	{-0.053,0.091}	0.1466	0.9389	0.1303	0.9470
1	75th-90th	{-1.46,2.04}	{-1.59,3.77}	{-1.7,5.81}	0.2260	1.5463	2.3323	1.4640
2	75th-90th	{-1.22,1.62}	{-1.32,2.71}	{-1.4,3.97}	0.1471	1.4404	1.6369	1.3727
5	75th-90th	{-0.93,1.08}	{-1.03,1.72}	{-1.1,2.44}	0.0871	1.3261	1.0095	1.2722
25	75th-90th	{-0.48,0.51}	{-0.57,0.77}	{-0.64,1.02}	0.0405	1.1712	0.4283	1.1496
50	75th-90th	{-0.35,0.36}	{-0.41,0.53}	{-0.48,0.71}	0.0280	1.1241	0.2964	1.1094
250	75th-90th	{-0.16,0.15}	{-0.2,0.21}	{-0.23,0.26}	0.0126	1.0563	0.1262	1.0444
1,000	75th-90th	{-0.082,0.076}	{-0.1,0.1}	{-0.12,0.13}	0.0068	1.0287	0.0633	1.0244
5,000	75th-90th	{-0.036,0.033}	{-0.045,0.043}	{-0.052,0.052}	0.0031	1.0132	0.0270	1.0116
1	90th-100th	{-2.82,3.29}	{-3.3,5.98}	{-3.78,9.04}	0.9324	2.9739	3.8712	2.7265
2	90th-100th	{-1.95,2.3}	{-2.3,3.86}	{-2.66,5.86}	0.6665	2.3641	2.4628	2.2020
5	90th-100th	{-1.31,1.42}	{-1.53,2.4}	{-1.82,3.51}	0.7230	2.0136	1.5454	1.9046
25	90th-100th	{-0.63,0.54}	{-0.75,0.88}	{-0.89,1.22}	0.7112	1.5954	0.8325	1.5096
50	90th-100th	{-0.46,0.37}	{-0.59,0.53}	{-0.7,0.7}	0.4787	1.4999	0.5191	1.4223
250	90th-100th	{-0.26,0.15}	{-0.34,0.21}	{-0.43,0.29}	0.6771	1.4585	0.6224	1.4007
1,000	90th-100th	{-0.19,0.064}	{-0.26,0.089}	{-0.31,0.11}	0.6422	1.4214	0.5715	1.3671
5,000	90th-100th	{-0.17,0.023}	{-0.22,0.033}	{-0.27,0.044}	0.5815	1.3936	0.5125	1.3400

Data Quality: HCC Using CY2007 (Ignore Professional Dx)

Accuracy Metrics

Group Size	R-Square	MAPE
1	9.1%	0.9866
2	10.2%	0.8199
5	17.5%	0.5886
25	21.3%	0.2883
50	43.1%	0.2157
250	77.2%	0.1023
1,000	89.9%	0.0559
5,000	96.4%	0.0291

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.1,1.41}	{-1.42,2.93}	{-1.79,4.75}	0.6533	0.9938	2.0550	0.9940
2	All	{-0.94,1.3}	{-1.16,2.33}	{-1.41,3.53}	0.4980	1.0132	1.4797	1.0157
5	All	{-0.73,0.96}	{-0.88,1.56}	{-1.03,2.21}	0.4430	1.0185	0.9873	1.0179
25	All	{-0.41,0.49}	{-0.49,0.72}	{-0.56,0.96}	0.2131	0.9811	0.4374	0.9848
50	All	{-0.32,0.35}	{-0.39,0.51}	{-0.44,0.66}	0.2653	1.0046	0.3760	1.0038
250	All	{-0.15,0.17}	{-0.2,0.23}	{-0.24,0.28}	0.2590	1.0010	0.2774	1.0026
1,000	All	{-0.084,0.088}	{-0.11,0.12}	{-0.14,0.15}	0.2381	0.9946	0.2343	0.9947
5,000	All	{-0.042,0.044}	{-0.057,0.062}	{-0.082,0.082}	0.2318	1.0028	0.2212	1.0025
1	0-75th	{-0.79,1.07}	{-0.89,2.32}	{-0.97,3.86}	0.2227	0.7057	1.5165	0.7142
2	0-75th	{-0.75,1.11}	{-0.85,1.99}	{-0.93,3}	0.2091	0.7889	1.1660	0.7979
5	0-75th	{-0.63,0.87}	{-0.72,1.39}	{-0.79,1.97}	0.1845	0.8401	0.7937	0.8488
25	0-75th	{-0.38,0.47}	{-0.46,0.68}	{-0.52,0.9}	0.1439	0.9015	0.3900	0.9092
50	0-75th	{-0.3,0.34}	{-0.36,0.49}	{-0.4,0.64}	0.1264	0.9257	0.2905	0.9306
250	0-75th	{-0.14,0.16}	{-0.18,0.22}	{-0.21,0.27}	0.1326	0.9400	0.1727	0.9440
1,000	0-75th	{-0.078,0.087}	{-0.1,0.11}	{-0.12,0.14}	0.1347	0.9456	0.1407	0.9486
5,000	0-75th	{-0.038,0.044}	{-0.049,0.06}	{-0.06,0.079}	0.1149	0.9520	0.1096	0.9545
1	75th-90th	{-1.33,2.16}	{-1.43,3.87}	{-1.51,6.01}	0.1563	1.4171	2.3819	1.4263
2	75th-90th	{-1.17,1.74}	{-1.27,2.93}	{-1.34,4.31}	0.1238	1.3824	1.6988	1.3908
5	75th-90th	{-0.92,1.15}	{-1.01,1.82}	{-1.08,2.59}	0.0820	1.2930	1.0277	1.2763
25	75th-90th	{-0.46,0.51}	{-0.55,0.76}	{-0.61,0.99}	0.0319	1.1285	0.4162	1.1164
50	75th-90th	{-0.35,0.36}	{-0.41,0.53}	{-0.46,0.69}	0.0228	1.0961	0.2964	1.0882
250	75th-90th	{-0.16,0.18}	{-0.2,0.23}	{-0.23,0.28}	0.0103	1.0458	0.1322	1.0464
1,000	75th-90th	{-0.082,0.085}	{-0.1,0.11}	{-0.12,0.13}	0.0049	1.0224	0.0654	1.0232
5,000	75th-90th	{-0.037,0.034}	{-0.046,0.045}	{-0.055,0.054}	0.0030	1.0116	0.0283	1.0105
1	90th-100th	{-2.31,3.19}	{-2.77,5.66}	{-3.3,8.7}	0.8106	2.5120	3.6709	2.4364
2	90th-100th	{-1.75,2.33}	{-2.02,3.91}	{-2.28,5.85}	0.5300	2.1384	2.3778	2.0833
5	90th-100th	{-1.25,1.51}	{-1.47,2.41}	{-1.73,3.55}	0.6990	1.9442	1.5321	1.8983
25	90th-100th	{-0.53,0.63}	{-0.63,0.92}	{-0.72,1.26}	0.2751	1.3573	0.5540	1.3548
50	90th-100th	{-0.45,0.44}	{-0.58,0.64}	{-0.7,0.82}	0.5640	1.4585	0.6481	1.4260
250	90th-100th	{-0.23,0.2}	{-0.33,0.28}	{-0.4,0.38}	0.5963	1.3913	0.5930	1.3762
1,000	90th-100th	{-0.17,0.11}	{-0.27,0.16}	{-0.31,0.2}	0.5529	1.3203	0.5337	1.2984
5,000	90th-100th	{-0.13,0.072}	{-0.17,0.099}	{-0.22,0.12}	0.5331	1.3701	0.5097	1.3503

Baseline: Age/Gender Slope using CY2007 Allowed Cost

Accuracy Metrics

Group Size	R-Square	MAPE
1	0.5%	1.0760
2	0.5%	0.8773
5	0.8%	0.6221
25	2.7%	0.3080
50	3.8%	0.2246
250	13.9%	0.1066
1,000	38.1%	0.0555
5,000	69.4%	0.0265

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.01,1.59}	{-1.08,3.22}	{-1.13,5.17}	0.1459	0.9948	2.0422	0.9936
2	All	{-0.9,1.41}	{-0.97,2.48}	{-1.02,3.72}	0.1092	0.9994	1.4672	0.9980
5	All	{-0.75,1.03}	{-0.82,1.65}	{-0.87,2.34}	0.0835	0.9978	0.9307	0.9988
25	All	{-0.44,0.52}	{-0.52,0.75}	{-0.58,1.01}	0.0630	0.9977	0.4150	0.9938
50	All	{-0.33,0.38}	{-0.39,0.54}	{-0.44,0.7}	0.0564	0.9995	0.2978	1.0029
250	All	{-0.16,0.18}	{-0.2,0.24}	{-0.23,0.3}	0.0565	0.9987	0.1476	1.0004
1,000	All	{-0.088,0.087}	{-0.11,0.12}	{-0.13,0.14}	0.0579	1.0006	0.0928	0.9997
5,000	All	{-0.042,0.041}	{-0.054,0.055}	{-0.066,0.069}	0.0513	1.0004	0.0629	1.0004
1	0-75th	{-0.92,1.46}	{-0.99,3.09}	{-1.03,5.08}	0.1063	0.9257	2.0209	0.9241
2	0-75th	{-0.87,1.36}	{-0.92,2.44}	{-0.96,3.69}	0.0791	0.9516	1.4533	0.9512
5	0-75th	{-0.73,1.01}	{-0.8,1.63}	{-0.85,2.33}	0.0617	0.9633	0.9213	0.9643
25	0-75th	{-0.44,0.51}	{-0.51,0.75}	{-0.57,1.01}	0.0496	0.9757	0.4122	0.9700
50	0-75th	{-0.32,0.38}	{-0.39,0.53}	{-0.44,0.7}	0.0443	0.9811	0.2929	0.9837
250	0-75th	{-0.16,0.17}	{-0.2,0.24}	{-0.23,0.3}	0.0448	0.9834	0.1437	0.9858
1,000	0-75th	{-0.087,0.085}	{-0.11,0.11}	{-0.13,0.14}	0.0433	0.9859	0.0856	0.9851
5,000	0-75th	{-0.042,0.041}	{-0.054,0.054}	{-0.067,0.068}	0.0397	0.9868	0.0538	0.9865
1	75th-90th	{-1.09,1.83}	{-1.12,3.29}	{-1.13,4.99}	0.0144	1.1454	1.9878	1.1306
2	75th-90th	{-0.99,1.53}	{-1.03,2.58}	{-1.06,3.74}	0.0190	1.1130	1.4667	1.1049
5	75th-90th	{-0.8,1.08}	{-0.87,1.69}	{-0.92,2.35}	0.0152	1.0718	0.9408	1.0742
25	75th-90th	{-0.44,0.51}	{-0.52,0.75}	{-0.57,1}	0.0065	1.0338	0.4020	1.0326
50	75th-90th	{-0.32,0.4}	{-0.39,0.56}	{-0.44,0.71}	0.0048	1.0242	0.2959	1.0330
250	75th-90th	{-0.16,0.17}	{-0.2,0.23}	{-0.23,0.28}	0.0025	1.0114	0.1305	1.0100
1,000	75th-90th	{-0.081,0.082}	{-0.1,0.11}	{-0.12,0.14}	0.0013	1.0057	0.0654	1.0047
5,000	75th-90th	{-0.038,0.038}	{-0.049,0.05}	{-0.058,0.059}	0.0028	1.0036	0.0301	1.0033
1	90th-100th	{-1.17,2.01}	{-1.2,3.85}	{-1.24,5.93}	0.0490	1.2197	2.2238	1.2412
2	90th-100th	{-1.04,1.58}	{-1.1,2.66}	{-1.13,3.91}	0.0353	1.1824	1.5444	1.1846
5	90th-100th	{-0.84,1.11}	{-0.92,1.74}	{-0.97,2.42}	0.0417	1.1458	0.9641	1.1440
25	90th-100th	{-0.46,0.54}	{-0.55,0.77}	{-0.61,1.02}	0.0569	1.1085	0.4299	1.1140
50	90th-100th	{-0.34,0.38}	{-0.41,0.55}	{-0.47,0.74}	0.0603	1.0897	0.3122	1.0918
250	90th-100th	{-0.18,0.19}	{-0.22,0.24}	{-0.25,0.3}	0.0758	1.0944	0.1634	1.0949
1,000	90th-100th	{-0.1,0.1}	{-0.13,0.13}	{-0.14,0.16}	0.0844	1.1037	0.1125	1.1022
5,000	90th-100th	{-0.043,0.051}	{-0.056,0.07}	{-0.064,0.081}	0.0597	1.0977	0.0705	1.1007

Standard Model: HCC Using CY2007 Claims

Accuracy Metrics

Group Size	R-Square	MAPE
1	11.2%	0.9279
2	17.3%	0.7673
5	27.1%	0.5294
25	66.4%	0.2767
50	79.9%	0.2129
250	93.4%	0.1106
1,000	96.7%	0.0789
5,000	97.3%	0.0660

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.12,1.31}	{-1.62,2.75}	{-2.12,4.53}	0.7759	0.9614	1.9851	0.9648
2	All	{-0.96,1.2}	{-1.27,2.18}	{-1.68,3.3}	0.7142	0.9897	1.4898	0.9918
5	All	{-0.7,0.87}	{-0.92,1.4}	{-1.14,2.01}	0.5862	0.9471	0.9685	0.9541
25	All	{-0.41,0.44}	{-0.56,0.65}	{-0.73,0.89}	0.6396	0.9825	0.6743	0.9832
50	All	{-0.34,0.32}	{-0.47,0.46}	{-0.61,0.6}	0.6707	1.0284	0.6476	1.0165
250	All	{-0.17,0.17}	{-0.24,0.22}	{-0.33,0.26}	0.6471	0.9377	0.5832	0.9466
1,000	All	{-0.13,0.11}	{-0.2,0.13}	{-0.28,0.16}	0.6612	0.9897	0.5853	0.9902
5,000	All	{-0.11,0.094}	{-0.19,0.11}	{-0.25,0.12}	0.6212	0.9694	0.5429	0.9724
1	0-75th	{-0.69,0.98}	{-0.83,2.14}	{-0.93,3.61}	0.2650	0.5980	1.4013	0.6529
2	0-75th	{-0.65,1.01}	{-0.76,1.82}	{-0.87,2.74}	0.2699	0.6612	1.0627	0.7079
5	0-75th	{-0.52,0.78}	{-0.62,1.24}	{-0.71,1.74}	0.2452	0.6776	0.7020	0.7231
25	0-75th	{-0.29,0.41}	{-0.38,0.58}	{-0.46,0.78}	0.2723	0.6961	0.3930	0.7373
50	0-75th	{-0.24,0.32}	{-0.31,0.44}	{-0.36,0.56}	0.2805	0.7267	0.3371	0.7574
250	0-75th	{-0.1,0.18}	{-0.14,0.22}	{-0.18,0.27}	0.2670	0.6809	0.2595	0.7234
1,000	0-75th	{-0.053,0.12}	{-0.079,0.14}	{-0.099,0.17}	0.2639	0.7169	0.2427	0.7547
5,000	0-75th	{-0.022,0.099}	{-0.037,0.12}	{-0.05,0.13}	0.2620	0.7009	0.2336	0.7409
1	75th-90th	{-1.43,2.01}	{-1.61,3.71}	{-1.75,5.59}	0.2695	1.5110	2.2888	1.4274
2	75th-90th	{-1.23,1.61}	{-1.34,2.71}	{-1.43,4.01}	0.1610	1.4768	1.6300	1.4037
5	75th-90th	{-0.97,1.1}	{-1.09,1.74}	{-1.18,2.41}	0.1540	1.4372	1.0009	1.3632
25	75th-90th	{-0.55,0.5}	{-0.65,0.75}	{-0.74,1.04}	0.1915	1.3897	0.4721	1.3249
50	75th-90th	{-0.46,0.33}	{-0.55,0.49}	{-0.63,0.63}	0.2058	1.4726	0.3666	1.3869
250	75th-90th	{-0.21,0.15}	{-0.25,0.2}	{-0.29,0.25}	0.1418	1.1989	0.1751	1.1695
1,000	75th-90th	{-0.16,0.042}	{-0.19,0.065}	{-0.22,0.086}	0.1667	1.3200	0.1517	1.2639
5,000	75th-90th	{-0.11,0.0044}	{-0.14,0.018}	{-0.15,0.035}	0.1976	1.3284	0.1668	1.2741
1	90th-100th	{-2.67,3.21}	{-2.95,5.79}	{-3.23,8.67}	0.6219	2.8460	3.6123	2.5956
2	90th-100th	{-2.24,2.43}	{-2.55,4.14}	{-2.79,6.1}	0.6066	2.7147	2.5684	2.4962
5	90th-100th	{-1.41,1.38}	{-1.66,2.25}	{-1.92,3.25}	0.6273	2.2300	1.5088	2.0703
25	90th-100th	{-0.96,0.67}	{-1.13,1.05}	{-1.28,1.37}	0.5018	2.5213	0.8067	2.3165
50	90th-100th	{-0.78,0.4}	{-0.94,0.66}	{-1.08,0.84}	0.5661	2.6232	0.7107	2.4036
250	90th-100th	{-0.45,0.08}	{-0.54,0.17}	{-0.64,0.25}	0.8204	2.4716	0.7800	2.2858
1,000	90th-100th	{-0.37,-0.052}	{-0.42,-0.02}	{-0.46,0.009}	0.8267	2.5397	0.7638	2.3459
5,000	90th-100th	{-0.29,-0.094}	{-0.31,-0.073}	{-0.34,-0.058}	0.6131	2.4444	0.5583	2.2556

Lag: HCC Using CY2006-7 Less CY07 Q4

Accuracy Metrics

Group Size	R-Square	MAPE
1	10.4%	0.9143
2	14.4%	0.7384
5	22.4%	0.5231
25	61.8%	0.2816
50	70.5%	0.2163
250	89.4%	0.1234
1,000	93.3%	0.0963
5,000	94.1%	0.0784

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.11,1.29}	{-1.62,2.71}	{-2.08,4.48}	0.8104	0.9271	1.9966	0.9417
2	All	{-0.92,1.17}	{-1.24,2.12}	{-1.56,3.21}	0.6760	0.9211	1.4291	0.9341
5	All	{-0.7,0.88}	{-0.91,1.42}	{-1.13,2.03}	0.5462	0.9005	0.9293	0.9164
25	All	{-0.41,0.45}	{-0.55,0.66}	{-0.69,0.91}	0.6420	0.9704	0.6514	0.9777
50	All	{-0.34,0.35}	{-0.46,0.48}	{-0.57,0.64}	0.5588	0.9855	0.5409	0.9894
250	All	{-0.19,0.18}	{-0.28,0.23}	{-0.41,0.27}	0.6265	0.9579	0.5285	0.9625
1,000	All	{-0.15,0.13}	{-0.26,0.16}	{-0.38,0.18}	0.6404	0.9775	0.5291	0.9804
5,000	All	{-0.13,0.11}	{-0.2,0.13}	{-0.32,0.14}	0.5715	0.9654	0.4695	0.9726
1	0-75th	{-0.64,0.98}	{-0.76,2.15}	{-0.85,3.6}	0.2300	0.5567	1.4085	0.6387
2	0-75th	{-0.62,1.01}	{-0.74,1.82}	{-0.82,2.73}	0.2585	0.6167	1.0623	0.6850
5	0-75th	{-0.52,0.8}	{-0.63,1.28}	{-0.72,1.81}	0.2779	0.6510	0.7257	0.7114
25	0-75th	{-0.3,0.44}	{-0.39,0.63}	{-0.46,0.84}	0.2759	0.7191	0.4018	0.7718
50	0-75th	{-0.23,0.34}	{-0.31,0.47}	{-0.37,0.61}	0.3037	0.7329	0.3546	0.7812
250	0-75th	{-0.1,0.19}	{-0.15,0.24}	{-0.18,0.28}	0.2627	0.6999	0.2486	0.7505
1,000	0-75th	{-0.052,0.14}	{-0.078,0.17}	{-0.1,0.19}	0.2657	0.7124	0.2353	0.7627
5,000	0-75th	{-0.017,0.12}	{-0.032,0.13}	{-0.043,0.14}	0.2591	0.7173	0.2240	0.7691
1	75th-90th	{-1.42,2.02}	{-1.61,3.71}	{-1.73,5.63}	0.2640	1.4914	2.2862	1.4128
2	75th-90th	{-1.2,1.59}	{-1.32,2.66}	{-1.42,3.91}	0.1720	1.4307	1.5916	1.3551
5	75th-90th	{-0.93,1.08}	{-1.04,1.69}	{-1.12,2.39}	0.1330	1.3431	0.9738	1.2921
25	75th-90th	{-0.52,0.49}	{-0.62,0.73}	{-0.69,1}	0.0996	1.3101	0.4373	1.2631
50	75th-90th	{-0.44,0.33}	{-0.52,0.48}	{-0.58,0.66}	0.1484	1.4169	0.3286	1.3434
250	75th-90th	{-0.22,0.14}	{-0.26,0.19}	{-0.3,0.25}	0.1525	1.2814	0.1827	1.2391
1,000	75th-90th	{-0.15,0.06}	{-0.18,0.089}	{-0.2,0.11}	0.1930	1.2828	0.1635	1.2408
5,000	75th-90th	{-0.11,0.013}	{-0.13,0.031}	{-0.15,0.05}	0.1583	1.3200	0.1239	1.2734
1	90th-100th	{-2.64,2.95}	{-3.24,5.46}	{-4.06,8.45}	0.9255	2.8509	3.6961	2.5009
2	90th-100th	{-1.98,2.09}	{-2.35,3.64}	{-2.9,5.53}	0.7896	2.4469	2.4310	2.1770
5	90th-100th	{-1.43,1.26}	{-1.64,2.09}	{-1.81,3.05}	0.3847	2.1133	1.3364	1.8944
25	90th-100th	{-0.98,0.55}	{-1.23,0.91}	{-1.54,1.26}	0.9993	2.3462	1.0288	2.0950
50	90th-100th	{-0.72,0.39}	{-0.85,0.6}	{-0.95,0.76}	0.3329	2.2219	0.5126	2.0109
250	90th-100th	{-0.59,0.018}	{-0.72,0.095}	{-0.87,0.16}	0.7831	2.4082	0.6693	2.1372
1,000	90th-100th	{-0.5,-0.11}	{-0.64,-0.069}	{-0.71,-0.042}	0.7112	2.5083	0.5861	2.2228
5,000	90th-100th	{-0.41,-0.13}	{-0.47,-0.11}	{-0.52,-0.1}	0.5557	2.2943	0.4496	2.0480

Lag: HCC Using CY2006-7 Less CY07 Q3 & Q4

Accuracy Metrics

Group Size	R-Square	MAPE
1	8.8%	0.9541
2	13.1%	0.8048
5	30.4%	0.5918
25	69.2%	0.3141
50	68.5%	0.2142
250	86.7%	0.1336
1,000	90.8%	0.1006
5,000	92.3%	0.0899

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.22,1.35}	{-1.7,2.82}	{-2.17,4.62}	0.7808	0.9714	2.0112	0.9742
2	All	{-1.03,1.26}	{-1.36,2.26}	{-1.73,3.43}	0.7187	1.0275	1.4938	1.0224
5	All	{-0.77,0.93}	{-1.05,1.52}	{-1.48,2.17}	0.8144	1.0661	1.1077	1.0525
25	All	{-0.47,0.47}	{-0.69,0.68}	{-1.06,0.91}	0.9144	1.0777	0.8272	1.0567
50	All	{-0.32,0.35}	{-0.43,0.49}	{-0.55,0.62}	0.5696	0.9498	0.5306	0.9576
250	All	{-0.21,0.19}	{-0.33,0.24}	{-0.47,0.29}	0.6372	0.9904	0.5189	0.9916
1,000	All	{-0.14,0.14}	{-0.25,0.17}	{-0.39,0.18}	0.6045	0.9724	0.4856	0.9780
5,000	All	{-0.14,0.12}	{-0.25,0.14}	{-0.39,0.14}	0.6102	0.9837	0.4856	0.9879
1	0-75th	{-0.69,1.05}	{-0.8,2.27}	{-0.91,3.79}	0.2531	0.5956	1.4599	0.6765
2	0-75th	{-0.7,1.1}	{-0.83,1.97}	{-0.94,2.97}	0.2918	0.7059	1.1379	0.7698
5	0-75th	{-0.56,0.86}	{-0.68,1.36}	{-0.76,1.91}	0.2724	0.7309	0.7599	0.7891
25	0-75th	{-0.3,0.46}	{-0.39,0.65}	{-0.46,0.85}	0.2758	0.7041	0.4013	0.7637
50	0-75th	{-0.23,0.35}	{-0.3,0.48}	{-0.36,0.61}	0.2917	0.7208	0.3452	0.7735
250	0-75th	{-0.098,0.21}	{-0.14,0.25}	{-0.18,0.3}	0.2654	0.7180	0.2502	0.7743
1,000	0-75th	{-0.049,0.15}	{-0.075,0.17}	{-0.098,0.19}	0.2721	0.7189	0.2368	0.7741
5,000	0-75th	{-0.016,0.13}	{-0.029,0.14}	{-0.041,0.15}	0.2650	0.7165	0.2255	0.7745
1	75th-90th	{-1.55,2.06}	{-1.69,3.87}	{-1.78,5.88}	0.2396	1.6130	2.4043	1.4965
2	75th-90th	{-1.3,1.67}	{-1.43,2.79}	{-1.53,4.13}	0.1895	1.5458	1.6648	1.4477
5	75th-90th	{-0.97,1.12}	{-1.09,1.75}	{-1.2,2.45}	0.1595	1.4095	1.0088	1.3375
25	75th-90th	{-0.6,0.5}	{-0.7,0.77}	{-0.81,0.98}	0.2337	1.4614	0.4936	1.3731
50	75th-90th	{-0.42,0.34}	{-0.5,0.51}	{-0.56,0.66}	0.1032	1.3125	0.3181	1.2579
250	75th-90th	{-0.25,0.15}	{-0.3,0.21}	{-0.34,0.27}	0.1801	1.3478	0.2054	1.2940
1,000	75th-90th	{-0.16,0.07}	{-0.19,0.099}	{-0.22,0.13}	0.1599	1.3263	0.1448	1.2802
5,000	75th-90th	{-0.13,0.012}	{-0.15,0.028}	{-0.17,0.04}	0.1795	1.3745	0.1411	1.3138
1	90th-100th	{-2.77,2.88}	{-3.06,5.4}	{-3.27,8.17}	0.6313	2.8300	3.5526	2.4258
2	90th-100th	{-2.21,2.1}	{-2.66,3.65}	{-3.13,5.58}	0.7943	2.6588	2.4730	2.2770
5	90th-100th	{-2.15,1.47}	{-2.65,2.58}	{-3.05,3.93}	1.0104	3.0653	1.8365	2.6007
25	90th-100th	{-1.56,0.51}	{-1.9,0.91}	{-2.19,1.31}	1.2191	3.3012	1.2286	2.7770
50	90th-100th	{-0.75,0.29}	{-1.02,0.49}	{-1.25,0.68}	0.7921	2.1181	0.7183	1.8845
250	90th-100th	{-0.7,-0.014}	{-0.83,0.07}	{-0.96,0.16}	0.6810	2.4974	0.5345	2.1674
1,000	90th-100th	{-0.57,-0.078}	{-0.69,-0.035}	{-0.83,-0.013}	0.7163	2.3429	0.5482	2.0534
5,000	90th-100th	{-0.51,-0.14}	{-0.6,-0.12}	{-0.76,-0.11}	0.6115	2.4016	0.4584	2.0996

Eligibility: HCC Using CY2007 Q2-4; 9 Months

Accuracy Metrics

Group Size	R-Square	MAPE
1	9.8%	0.8761
2	21.3%	0.7626
5	33.5%	0.5500
25	68.4%	0.2850
50	77.6%	0.1991
250	94.9%	0.1103
1,000	96.8%	0.0748
5,000	97.6%	0.0569

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.03,1.24}	{-1.41,2.61}	{-1.8,4.33}	0.6647	0.8888	1.8668	0.8997
2	All	{-0.91,1.18}	{-1.26,2.15}	{-1.69,3.26}	0.8065	0.9880	1.5465	0.9877
5	All	{-0.73,0.88}	{-0.95,1.43}	{-1.19,2.06}	0.6928	1.0028	1.0662	1.0019
25	All	{-0.43,0.45}	{-0.59,0.66}	{-0.78,0.89}	0.6787	1.0319	0.7121	1.0274
50	All	{-0.3,0.32}	{-0.41,0.46}	{-0.52,0.61}	0.5797	0.9212	0.5791	0.9273
250	All	{-0.18,0.16}	{-0.26,0.21}	{-0.35,0.26}	0.7091	1.0050	0.6537	1.0033
1,000	All	{-0.12,0.11}	{-0.18,0.13}	{-0.24,0.16}	0.6238	0.9626	0.5622	0.9667
5,000	All	{-0.097,0.087}	{-0.13,0.098}	{-0.17,0.11}	0.5464	0.9456	0.4864	0.9502
1	0-75th	{-0.67,0.93}	{-0.77,2.06}	{-0.83,3.48}	0.2248	0.5795	1.3662	0.6290
2	0-75th	{-0.63,0.98}	{-0.73,1.77}	{-0.82,2.67}	0.2325	0.6429	1.0443	0.6847
5	0-75th	{-0.55,0.77}	{-0.66,1.23}	{-0.75,1.72}	0.2701	0.7080	0.7175	0.7400
25	0-75th	{-0.3,0.42}	{-0.39,0.6}	{-0.46,0.79}	0.2531	0.7153	0.3854	0.7510
50	0-75th	{-0.22,0.31}	{-0.29,0.43}	{-0.35,0.55}	0.2831	0.6723	0.3348	0.7082
250	0-75th	{-0.11,0.17}	{-0.15,0.21}	{-0.19,0.25}	0.2574	0.7109	0.2538	0.7410
1,000	0-75th	{-0.056,0.12}	{-0.086,0.14}	{-0.11,0.16}	0.2629	0.7038	0.2428	0.7381
5,000	0-75th	{-0.026,0.092}	{-0.041,0.1}	{-0.061,0.11}	0.2512	0.7130	0.2266	0.7462
1	75th-90th	{-1.31,1.91}	{-1.41,3.52}	{-1.51,5.34}	0.2021	1.3843	2.1339	1.3186
2	75th-90th	{-1.2,1.59}	{-1.35,2.71}	{-1.48,3.94}	0.2224	1.4399	1.6135	1.3781
5	75th-90th	{-0.97,1.1}	{-1.08,1.73}	{-1.16,2.39}	0.1457	1.4281	1.0152	1.3655
25	75th-90th	{-0.6,0.55}	{-0.71,0.83}	{-0.82,1.1}	0.2790	1.5249	0.5395	1.4640
50	75th-90th	{-0.4,0.35}	{-0.47,0.52}	{-0.53,0.67}	0.1305	1.2884	0.3139	1.2421
250	75th-90th	{-0.24,0.14}	{-0.28,0.21}	{-0.33,0.26}	0.2258	1.3409	0.2374	1.2921
1,000	75th-90th	{-0.15,0.064}	{-0.19,0.096}	{-0.21,0.12}	0.2053	1.2698	0.1882	1.2313
5,000	75th-90th	{-0.1,0.021}	{-0.11,0.04}	{-0.12,0.054}	0.1565	1.2771	0.1305	1.2343
1	90th-100th	{-2.31,2.94}	{-2.6,5.28}	{-2.88,8}	0.6471	2.4606	3.3517	2.2979
2	90th-100th	{-2.24,2.52}	{-2.85,4.32}	{-3.6,6.47}	1.0842	2.8984	2.8406	2.6750
5	90th-100th	{-1.58,1.63}	{-1.93,2.67}	{-2.3,3.92}	0.9046	2.5798	1.7986	2.4240
25	90th-100th	{-0.99,0.65}	{-1.15,0.98}	{-1.31,1.32}	0.4741	2.6644	0.8090	2.4434
50	90th-100th	{-0.65,0.46}	{-0.83,0.69}	{-0.96,0.87}	0.5784	2.2377	0.6967	2.0981
250	90th-100th	{-0.46,0.11}	{-0.55,0.21}	{-0.62,0.31}	0.8594	2.7076	0.8437	2.5374
1,000	90th-100th	{-0.31,-0.017}	{-0.37,0.012}	{-0.4,0.046}	0.6895	2.4427	0.6578	2.2844
5,000	90th-100th	{-0.23,-0.069}	{-0.26,-0.058}	{-0.28,-0.043}	0.5904	2.1930	0.5490	2.0549

Eligibility: HCC Using CY2007 Q3-4; 6 Months

Accuracy Metrics

Group Size	R-Square	MAPE
1	9.4%	0.9534
2	15.5%	0.7105
5	34.8%	0.5721
25	61.3%	0.2667
50	82.4%	0.2070
250	93.8%	0.1059
1,000	97.6%	0.0734
5,000	98.0%	0.0521

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.09,1.38}	{-1.42,2.82}	{-1.81,4.6}	0.6628	0.9776	1.9773	0.9774
2	All	{-0.87,1.13}	{-1.16,2.06}	{-1.44,3.15}	0.6056	0.8869	1.3871	0.9026
5	All	{-0.74,0.92}	{-0.98,1.49}	{-1.22,2.16}	0.7146	1.0512	1.1099	1.0484
25	All	{-0.39,0.43}	{-0.51,0.64}	{-0.63,0.88}	0.5214	0.9291	0.6032	0.9321
50	All	{-0.31,0.33}	{-0.42,0.47}	{-0.54,0.62}	0.6660	1.0049	0.6752	1.0023
250	All	{-0.17,0.16}	{-0.24,0.22}	{-0.31,0.26}	0.5961	0.9678	0.5603	0.9683
1,000	All	{-0.13,0.1}	{-0.18,0.13}	{-0.23,0.15}	0.6732	1.0134	0.6222	1.0112
5,000	All	{-0.092,0.08}	{-0.13,0.094}	{-0.16,0.11}	0.5274	0.9517	0.4787	0.9544
1	0-75th	{-0.74,1.06}	{-0.84,2.26}	{-0.91,3.77}	0.2240	0.6744	1.4777	0.7027
2	0-75th	{-0.59,0.93}	{-0.71,1.72}	{-0.8,2.64}	0.2279	0.6036	1.0163	0.6486
5	0-75th	{-0.56,0.8}	{-0.67,1.28}	{-0.76,1.8}	0.2444	0.7458	0.7328	0.7716
25	0-75th	{-0.31,0.4}	{-0.39,0.58}	{-0.46,0.77}	0.2445	0.7033	0.3798	0.7274
50	0-75th	{-0.24,0.31}	{-0.31,0.43}	{-0.38,0.56}	0.2499	0.7383	0.3211	0.7620
250	0-75th	{-0.12,0.16}	{-0.16,0.22}	{-0.2,0.26}	0.2563	0.7228	0.2565	0.7474
1,000	0-75th	{-0.066,0.11}	{-0.097,0.14}	{-0.13,0.16}	0.2546	0.7322	0.2395	0.7572
5,000	0-75th	{-0.033,0.087}	{-0.053,0.099}	{-0.084,0.11}	0.2440	0.7215	0.2236	0.7477
1	75th-90th	{-1.35,2}	{-1.44,3.69}	{-1.51,5.63}	0.1462	1.4531	2.2601	1.3961
2	75th-90th	{-1.16,1.56}	{-1.27,2.62}	{-1.35,3.81}	0.1668	1.3805	1.5581	1.3267
5	75th-90th	{-1,1.15}	{-1.12,1.8}	{-1.21,2.61}	0.1559	1.4830	1.0751	1.4326
25	75th-90th	{-0.49,0.5}	{-0.58,0.72}	{-0.66,1}	0.1399	1.2489	0.4406	1.2216
50	75th-90th	{-0.4,0.32}	{-0.47,0.48}	{-0.54,0.65}	0.1463	1.2826	0.3193	1.2306
250	75th-90th	{-0.21,0.15}	{-0.27,0.22}	{-0.32,0.27}	0.1815	1.2738	0.2149	1.2352
1,000	75th-90th	{-0.16,0.069}	{-0.2,0.095}	{-0.23,0.12}	0.2108	1.3468	0.2069	1.3008
5,000	75th-90th	{-0.1,0.02}	{-0.12,0.033}	{-0.15,0.043}	0.1659	1.2922	0.1456	1.2536
1	90th-100th	{-2.4,3.1}	{-2.69,5.54}	{-3.12,8.38}	0.7129	2.5435	3.4915	2.4130
2	90th-100th	{-1.8,2.23}	{-2.09,3.74}	{-2.41,5.69}	0.5939	2.2730	2.3444	2.1729
5	90th-100th	{-1.62,1.69}	{-1.96,2.74}	{-2.37,4.02}	0.9712	2.6943	1.8740	2.5483
25	90th-100th	{-0.79,0.66}	{-0.95,1.08}	{-1.09,1.45}	0.4823	2.1426	0.7835	2.0327
50	90th-100th	{-0.7,0.53}	{-0.86,0.78}	{-0.98,1.04}	0.8832	2.5906	0.9936	2.4656
250	90th-100th	{-0.38,0.15}	{-0.45,0.23}	{-0.51,0.29}	0.7215	2.3458	0.7242	2.2246
1,000	90th-100th	{-0.28,-0.005}	{-0.32,0.04}	{-0.35,0.075}	0.7934	2.6226	0.7771	2.4819
5,000	90th-100th	{-0.18,-0.047}	{-0.2,-0.034}	{-0.21,-0.028}	0.4950	2.1673	0.4666	2.0556

Eligibility: HCC Using CY2007 Q4; 3 Months

Accuracy Metrics

Group Size	R-Square	MAPE
1	8.7%	0.9257
2	15.3%	0.7736
5	30.4%	0.5884
25	59.9%	0.2538
50	66.3%	0.1972
250	93.8%	0.1137
1,000	97.0%	0.0726
5,000	98.0%	0.0501

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.02,1.33}	{-1.31,2.75}	{-1.62,4.47}	0.5949	0.9335	1.9194	0.9354
2	All	{-0.96,1.21}	{-1.24,2.2}	{-1.49,3.36}	0.6204	0.9806	1.4922	0.9866
5	All	{-0.78,0.93}	{-1,1.55}	{-1.21,2.23}	0.6388	1.0775	1.0955	1.0692
25	All	{-0.36,0.42}	{-0.47,0.62}	{-0.56,0.84}	0.4742	0.8508	0.5614	0.8563
50	All	{-0.29,0.33}	{-0.38,0.47}	{-0.45,0.62}	0.4081	0.8789	0.4590	0.8916
250	All	{-0.18,0.18}	{-0.24,0.24}	{-0.31,0.3}	0.6074	0.9821	0.6002	0.9824
1,000	All	{-0.12,0.12}	{-0.17,0.15}	{-0.21,0.18}	0.5870	0.9778	0.5613	0.9808
5,000	All	{-0.088,0.078}	{-0.11,0.11}	{-0.15,0.13}	0.5010	0.9493	0.4723	0.9510
1	0-75th	{-0.75,1.03}	{-0.84,2.22}	{-0.91,3.72}	0.2160	0.6695	1.4721	0.6875
2	0-75th	{-0.69,0.99}	{-0.81,1.84}	{-0.91,2.78}	0.2622	0.6907	1.1043	0.7158
5	0-75th	{-0.61,0.8}	{-0.73,1.3}	{-0.82,1.86}	0.2742	0.7867	0.7717	0.7960
25	0-75th	{-0.3,0.38}	{-0.38,0.56}	{-0.44,0.75}	0.2351	0.6583	0.3632	0.6783
50	0-75th	{-0.24,0.31}	{-0.31,0.44}	{-0.36,0.57}	0.2336	0.7062	0.3129	0.7324
250	0-75th	{-0.15,0.17}	{-0.19,0.23}	{-0.24,0.28}	0.2306	0.7447	0.2395	0.7574
1,000	0-75th	{-0.077,0.12}	{-0.11,0.15}	{-0.14,0.18}	0.2367	0.7340	0.2273	0.7538
5,000	0-75th	{-0.051,0.094}	{-0.092,0.12}	{-0.13,0.13}	0.2280	0.7366	0.2105	0.7525
1	75th-90th	{-1.24,1.9}	{-1.33,3.48}	{-1.39,5.29}	0.1329	1.3375	2.1238	1.3011
2	75th-90th	{-1.27,1.69}	{-1.38,2.87}	{-1.46,4.12}	0.1604	1.5214	1.6893	1.4738
5	75th-90th	{-1.06,1.23}	{-1.18,1.92}	{-1.27,2.75}	0.1023	1.5943	1.1320	1.5381
25	75th-90th	{-0.46,0.5}	{-0.54,0.73}	{-0.62,0.98}	0.0814	1.1449	0.4196	1.1273
50	75th-90th	{-0.37,0.38}	{-0.45,0.54}	{-0.51,0.71}	0.0931	1.1558	0.3157	1.1432
250	75th-90th	{-0.24,0.2}	{-0.31,0.27}	{-0.37,0.34}	0.1591	1.2499	0.2259	1.2268
1,000	75th-90th	{-0.19,0.11}	{-0.25,0.14}	{-0.31,0.19}	0.2094	1.2669	0.2343	1.2348
5,000	75th-90th	{-0.1,0.05}	{-0.13,0.07}	{-0.16,0.085}	0.1425	1.2459	0.1492	1.2246
1	90th-100th	{-2.17,2.96}	{-2.49,5.31}	{-2.94,7.96}	0.7156	2.3007	3.3768	2.2397
2	90th-100th	{-1.84,2.4}	{-2.13,4.01}	{-2.47,5.97}	0.6027	2.3484	2.5010	2.2908
5	90th-100th	{-1.49,1.74}	{-1.77,2.68}	{-2.05,3.9}	0.6991	2.4840	1.7066	2.4159
25	90th-100th	{-0.65,0.63}	{-0.8,0.94}	{-0.99,1.26}	0.6825	1.8314	0.8560	1.7640
50	90th-100th	{-0.5,0.44}	{-0.61,0.66}	{-0.68,0.83}	0.3634	1.7585	0.5226	1.7080
250	90th-100th	{-0.32,0.21}	{-0.37,0.3}	{-0.45,0.38}	0.9128	2.3566	0.9434	2.3001
1,000	90th-100th	{-0.22,0.075}	{-0.24,0.11}	{-0.28,0.14}	0.6481	2.3810	0.6558	2.3102
5,000	90th-100th	{-0.13,-0.009}	{-0.14,0.0043}	{-0.15,0.021}	0.5443	2.0992	0.5439	2.0290

Turnover: HCC Using CY2007 (10% New Mbrs)

Accuracy Metrics

Group Size	R-Square	MAPE
1	10.4%	0.9419
2	18.5%	0.7986
5	31.2%	0.5479
25	67.1%	0.2753
50	76.5%	0.2095
250	94.0%	0.1161
1,000	96.2%	0.0778
5,000	97.3%	0.0624

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.07,1.34}	{-1.48,2.8}	{-1.9,4.56}	0.7341	0.9642	1.9950	0.9675
2	All	{-0.96,1.24}	{-1.35,2.25}	{-1.82,3.43}	0.7736	1.0336	1.5706	1.0344
5	All	{-0.74,0.88}	{-0.95,1.44}	{-1.2,2.08}	0.6737	0.9860	1.0428	0.9842
25	All	{-0.42,0.43}	{-0.55,0.63}	{-0.71,0.87}	0.6458	0.9741	0.6757	0.9677
50	All	{-0.32,0.34}	{-0.43,0.48}	{-0.54,0.62}	0.5869	0.9943	0.5842	0.9964
250	All	{-0.19,0.17}	{-0.27,0.22}	{-0.36,0.27}	0.6997	1.0159	0.6326	1.0123
1,000	All	{-0.12,0.11}	{-0.19,0.14}	{-0.25,0.16}	0.5961	0.9797	0.5261	0.9806
5,000	All	{-0.1,0.093}	{-0.17,0.11}	{-0.24,0.12}	0.5954	0.9596	0.5214	0.9633
1	0-75th	{-0.75,1.04}	{-0.86,2.24}	{-0.93,3.73}	0.2506	0.6423	1.4731	0.6881
2	0-75th	{-0.69,1.04}	{-0.81,1.89}	{-0.89,2.83}	0.2563	0.6867	1.1058	0.7340
5	0-75th	{-0.56,0.77}	{-0.67,1.26}	{-0.76,1.78}	0.2855	0.6949	0.7322	0.7310
25	0-75th	{-0.31,0.41}	{-0.4,0.59}	{-0.47,0.79}	0.2925	0.7007	0.4065	0.7315
50	0-75th	{-0.24,0.33}	{-0.31,0.45}	{-0.37,0.59}	0.2829	0.7517	0.3440	0.7868
250	0-75th	{-0.12,0.18}	{-0.16,0.22}	{-0.19,0.27}	0.2701	0.7300	0.2633	0.7639
1,000	0-75th	{-0.062,0.12}	{-0.089,0.14}	{-0.11,0.16}	0.2760	0.7324	0.2518	0.7664
5,000	0-75th	{-0.024,0.1}	{-0.039,0.11}	{-0.05,0.12}	0.2639	0.7107	0.2336	0.7478
1	75th-90th	{-1.34,1.94}	{-1.48,3.62}	{-1.61,5.48}	0.2331	1.4149	2.1538	1.3409
2	75th-90th	{-1.28,1.63}	{-1.47,2.76}	{-1.62,4.06}	0.2976	1.5193	1.6743	1.4381
5	75th-90th	{-0.96,1.1}	{-1.06,1.75}	{-1.15,2.5}	0.1650	1.3927	1.0384	1.3387
25	75th-90th	{-0.52,0.48}	{-0.6,0.71}	{-0.67,0.97}	0.0711	1.2977	0.4197	1.2484
50	75th-90th	{-0.41,0.35}	{-0.49,0.5}	{-0.55,0.66}	0.1456	1.3226	0.3248	1.2741
250	75th-90th	{-0.25,0.13}	{-0.3,0.19}	{-0.33,0.23}	0.2042	1.3387	0.2163	1.2802
1,000	75th-90th	{-0.14,0.055}	{-0.17,0.079}	{-0.2,0.099}	0.1537	1.2975	0.1384	1.2545
5,000	75th-90th	{-0.11,0.017}	{-0.13,0.034}	{-0.15,0.045}	0.1645	1.2846	0.1308	1.2397
1	90th-100th	{-2.6,3.12}	{-2.97,5.64}	{-3.58,8.5}	0.8564	2.7016	3.6617	2.5022
2	90th-100th	{-2.31,2.56}	{-2.73,4.36}	{-3.16,6.55}	0.7199	2.9273	2.7638	2.6990
5	90th-100th	{-1.63,1.55}	{-1.97,2.47}	{-2.25,3.62}	0.7294	2.5578	1.6430	2.3500
25	90th-100th	{-0.97,0.58}	{-1.18,0.91}	{-1.33,1.24}	0.6681	2.5098	0.8761	2.2924
50	90th-100th	{-0.69,0.42}	{-0.84,0.64}	{-0.96,0.85}	0.6450	2.3336	0.7496	2.1628
250	90th-100th	{-0.48,0.075}	{-0.59,0.18}	{-0.67,0.28}	0.8739	2.6753	0.8404	2.4735
1,000	90th-100th	{-0.34,-0.043}	{-0.4,-0.012}	{-0.43,0.014}	0.6620	2.3572	0.6125	2.1770
5,000	90th-100th	{-0.28,-0.081}	{-0.3,-0.07}	{-0.33,-0.058}	0.6740	2.3395	0.6138	2.1648

Turnover: HCC Using CY2007 (30% New Mbrs)

Accuracy Metrics

Group Size	R-Square	MAPE
1	5.7%	0.9490
2	14.1%	0.8113
5	21.3%	0.5451
25	64.9%	0.2988
50	75.3%	0.2175
250	91.3%	0.1139
1,000	95.3%	0.0755
5,000	96.7%	0.0530

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.01,1.37}	{-1.16,2.85}	{-1.46,4.63}	0.5327	0.9246	1.9482	0.9366
2	All	{-0.93,1.27}	{-1.13,2.3}	{-1.44,3.46}	0.6476	1.0080	1.5246	1.0053
5	All	{-0.71,0.9}	{-0.88,1.46}	{-1.06,2.08}	0.5181	0.9391	0.9543	0.9468
25	All	{-0.44,0.47}	{-0.56,0.71}	{-0.69,0.94}	0.6413	1.0525	0.6994	1.0478
50	All	{-0.32,0.36}	{-0.42,0.51}	{-0.53,0.67}	0.5934	0.9984	0.5977	1.0060
250	All	{-0.18,0.18}	{-0.24,0.23}	{-0.31,0.28}	0.5614	0.9769	0.5122	0.9794
1,000	All	{-0.12,0.11}	{-0.18,0.14}	{-0.24,0.16}	0.5185	0.9767	0.4579	0.9779
5,000	All	{-0.078,0.088}	{-0.13,0.11}	{-0.2,0.12}	0.4774	0.9599	0.4160	0.9643
1	0-75th	{-0.85,1.15}	{-0.92,2.47}	{-0.99,4.13}	0.2574	0.7291	1.6813	0.7629
2	0-75th	{-0.76,1.11}	{-0.85,2.02}	{-0.92,3.05}	0.2542	0.7554	1.2076	0.7837
5	0-75th	{-0.58,0.82}	{-0.68,1.32}	{-0.75,1.88}	0.2571	0.7176	0.7678	0.7564
25	0-75th	{-0.36,0.45}	{-0.45,0.66}	{-0.52,0.88}	0.2564	0.8124	0.4182	0.8376
50	0-75th	{-0.26,0.34}	{-0.33,0.48}	{-0.39,0.62}	0.2579	0.7688	0.3356	0.8018
250	0-75th	{-0.13,0.18}	{-0.17,0.24}	{-0.21,0.28}	0.2600	0.7649	0.2617	0.7934
1,000	0-75th	{-0.073,0.12}	{-0.1,0.14}	{-0.12,0.17}	0.2569	0.7780	0.2366	0.8043
5,000	0-75th	{-0.026,0.097}	{-0.039,0.11}	{-0.051,0.12}	0.2527	0.7714	0.2237	0.8005
1	75th-90th	{-1.13,1.89}	{-1.17,3.5}	{-1.19,5.28}	0.0457	1.1949	2.0992	1.1920
2	75th-90th	{-1.11,1.59}	{-1.18,2.71}	{-1.26,3.96}	0.1217	1.3049	1.5521	1.2717
5	75th-90th	{-0.89,1.07}	{-0.98,1.7}	{-1.05,2.36}	0.0924	1.2770	0.9833	1.2470
25	75th-90th	{-0.51,0.52}	{-0.61,0.78}	{-0.68,0.98}	0.1164	1.3013	0.4438	1.2675
50	75th-90th	{-0.34,0.41}	{-0.41,0.59}	{-0.48,0.72}	0.0390	1.1477	0.3085	1.1545
250	75th-90th	{-0.19,0.17}	{-0.23,0.23}	{-0.26,0.3}	0.0777	1.1665	0.1564	1.1564
1,000	75th-90th	{-0.11,0.095}	{-0.14,0.13}	{-0.16,0.15}	0.0763	1.1759	0.0973	1.1655
5,000	75th-90th	{-0.071,0.047}	{-0.084,0.067}	{-0.097,0.076}	0.0901	1.1959	0.0805	1.1794
1	90th-100th	{-2.03,2.52}	{-2.52,4.6}	{-2.94,7.04}	0.7811	2.0718	3.0178	1.9366
2	90th-100th	{-1.96,2.21}	{-2.49,3.7}	{-3.24,5.61}	0.9904	2.4555	2.5747	2.2655
5	90th-100th	{-1.37,1.31}	{-1.66,2.12}	{-1.89,3.11}	0.5621	2.0886	1.3701	1.9201
25	90th-100th	{-0.91,0.59}	{-1.11,0.99}	{-1.36,1.39}	1.0153	2.4819	1.1498	2.2967
50	90th-100th	{-0.73,0.42}	{-0.87,0.63}	{-1.03,0.85}	0.8111	2.3945	0.8749	2.2210
250	90th-100th	{-0.42,0.069}	{-0.5,0.15}	{-0.6,0.21}	0.7351	2.2826	0.7015	2.1086
1,000	90th-100th	{-0.32,-0.035}	{-0.37,-0.003}	{-0.41,0.026}	0.6400	2.1680	0.5848	1.9985
5,000	90th-100th	{-0.26,-0.065}	{-0.29,-0.048}	{-0.3,-0.041}	0.5612	2.0196	0.5060	1.8696

Data Quality: HCC Using CY2007 (Ignore Inpatient Dx)

Accuracy Metrics

Group Size	R-Square	MAPE
1	11.49%	0.9927
2	16.9%	0.7900
5	28.7%	0.5221
25	73.2%	0.2886
50	78.7%	0.2047
250	94.6%	0.1146
1,000	96.5%	0.0796
5,000	97.1%	0.0642

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.28,1.4}	{-1.7,2.89}	{-2.19,4.7}	0.8214	1.0514	2.1052	1.0434
2	All	{-1.03,1.22}	{-1.37,2.21}	{-1.72,3.36}	0.7190	1.0345	1.5181	1.0274
5	All	{-0.67,0.86}	{-0.87,1.39}	{-1.1,2.01}	0.5892	0.9257	0.9656	0.9358
25	All	{-0.44,0.45}	{-0.6,0.67}	{-0.78,0.92}	0.7704	1.0473	0.7945	1.0407
50	All	{-0.32,0.33}	{-0.44,0.46}	{-0.57,0.59}	0.6258	0.9847	0.6063	0.9819
250	All	{-0.19,0.17}	{-0.27,0.21}	{-0.37,0.26}	0.7325	1.0216	0.6612	1.0186
1,000	All	{-0.13,0.11}	{-0.2,0.14}	{-0.28,0.16}	0.6394	0.9798	0.5654	0.9803
5,000	All	{-0.11,0.094}	{-0.17,0.11}	{-0.22,0.12}	0.5871	0.9509	0.5135	0.9557
1	0-75th	{-0.77,1.04}	{-0.94,2.23}	{-1.06,3.68}	0.3087	0.6613	1.4611	0.7042
2	0-75th	{-0.69,1.02}	{-0.83,1.83}	{-0.95,2.75}	0.2908	0.6950	1.0824	0.7315
5	0-75th	{-0.52,0.77}	{-0.61,1.22}	{-0.69,1.72}	0.2359	0.6702	0.6847	0.7118
25	0-75th	{-0.3,0.42}	{-0.39,0.61}	{-0.47,0.79}	0.2836	0.7083	0.4035	0.7452
50	0-75th	{-0.23,0.32}	{-0.3,0.43}	{-0.36,0.55}	0.2909	0.7077	0.3407	0.7427
250	0-75th	{-0.11,0.18}	{-0.15,0.22}	{-0.18,0.26}	0.2776	0.7123	0.2693	0.7489
1,000	0-75th	{-0.057,0.12}	{-0.085,0.15}	{-0.11,0.16}	0.2712	0.7089	0.2472	0.7458
5,000	0-75th	{-0.023,0.1}	{-0.038,0.11}	{-0.051,0.12}	0.2601	0.6964	0.2322	0.7361
1	75th-90th	{-1.59,2.23}	{-1.7,4.03}	{-1.78,6.08}	0.1794	1.7194	2.4937	1.6104
2	75th-90th	{-1.36,1.72}	{-1.5,2.88}	{-1.62,4.24}	0.2158	1.6409	1.7448	1.5480
5	75th-90th	{-0.9,1.08}	{-1,1.7}	{-1.09,2.44}	0.1545	1.3179	0.9753	1.2762
25	75th-90th	{-0.59,0.5}	{-0.7,0.75}	{-0.77,1}	0.2018	1.4757	0.4942	1.3925
50	75th-90th	{-0.43,0.33}	{-0.51,0.48}	{-0.59,0.64}	0.1885	1.4098	0.3437	1.3445
250	75th-90th	{-0.24,0.13}	{-0.3,0.19}	{-0.36,0.23}	0.2090	1.3962	0.2281	1.3344
1,000	75th-90th	{-0.15,0.041}	{-0.19,0.071}	{-0.23,0.093}	0.1894	1.3190	0.1687	1.2632
5,000	75th-90th	{-0.12,0.0081}	{-0.15,0.023}	{-0.18,0.04}	0.1902	1.3128	0.1534	1.2592
1	90th-100th	{-2.79,3.36}	{-3.15,6.04}	{-3.47,9.16}	0.6775	2.9794	3.8444	2.7394
2	90th-100th	{-2.16,2.43}	{-2.49,4.11}	{-2.79,6.15}	0.5674	2.6879	2.5610	2.4803
5	90th-100th	{-1.41,1.42}	{-1.67,2.38}	{-1.99,3.42}	0.7309	2.2537	1.5692	2.1052
25	90th-100th	{-1.08,0.78}	{-1.26,1.16}	{-1.46,1.55}	0.7280	2.9441	1.0193	2.7263
50	90th-100th	{-0.75,0.4}	{-0.89,0.61}	{-1.01,0.81}	0.5511	2.4264	0.6597	2.2336
250	90th-100th	{-0.49,0.078}	{-0.57,0.17}	{-0.69,0.27}	0.8412	2.7786	0.8098	2.5675
1,000	90th-100th	{-0.35,-0.038}	{-0.4,-0.008}	{-0.43,0.018}	0.6646	2.5025	0.6190	2.3145
5,000	90th-100th	{-0.28,-0.08}	{-0.3,-0.062}	{-0.33,-0.053}	0.5817	2.3164	0.5264	2.1477

Data Quality: HCC Using CY2007 (Ignore Outpatient Dx)

Accuracy Metrics

Group Size	R-Square	MAPE
1	11.5%	0.9961
2	19.1%	0.7755
5	26.4%	0.5271
25	60.8%	0.2727
50	79.7%	0.2131
250	93.6%	0.1148
1,000	96.9%	0.0851
5,000	96.9%	0.0634

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.24,1.4}	{-1.67,2.91}	{-2.18,4.73}	0.8179	1.0525	2.1039	1.0459
2	All	{-0.98,1.21}	{-1.3,2.19}	{-1.71,3.33}	0.7733	1.0089	1.5383	1.0107
5	All	{-0.7,0.87}	{-0.91,1.4}	{-1.12,2}	0.5724	0.9404	0.9605	0.9486
25	All	{-0.41,0.44}	{-0.54,0.65}	{-0.69,0.87}	0.5610	0.9663	0.6075	0.9671
50	All	{-0.34,0.33}	{-0.47,0.46}	{-0.59,0.61}	0.6623	1.0500	0.6401	1.0388
250	All	{-0.19,0.17}	{-0.27,0.22}	{-0.36,0.26}	0.6775	0.9945	0.6074	0.9945
1,000	All	{-0.15,0.12}	{-0.23,0.14}	{-0.3,0.16}	0.7298	1.0167	0.6437	1.0138
5,000	All	{-0.098,0.094}	{-0.17,0.11}	{-0.23,0.13}	0.5713	0.9406	0.4972	0.9469
1	0-75th	{-0.81,1.07}	{-0.97,2.28}	{-1.08,3.77}	0.3202	0.6762	1.4832	0.7174
2	0-75th	{-0.66,1.01}	{-0.79,1.82}	{-0.9,2.73}	0.2812	0.6663	1.0726	0.7155
5	0-75th	{-0.53,0.78}	{-0.64,1.23}	{-0.73,1.73}	0.2684	0.6830	0.7096	0.7254
25	0-75th	{-0.31,0.42}	{-0.4,0.6}	{-0.47,0.8}	0.2983	0.7205	0.4088	0.7592
50	0-75th	{-0.24,0.32}	{-0.31,0.43}	{-0.38,0.56}	0.2920	0.7533	0.3419	0.7829
250	0-75th	{-0.11,0.18}	{-0.15,0.22}	{-0.18,0.26}	0.2750	0.7088	0.2654	0.7483
1,000	0-75th	{-0.056,0.13}	{-0.081,0.15}	{-0.1,0.17}	0.2770	0.7025	0.2521	0.7415
5,000	0-75th	{-0.022,0.1}	{-0.036,0.11}	{-0.05,0.13}	0.2667	0.6973	0.2371	0.7377
1	75th-90th	{-1.52,2.16}	{-1.67,3.96}	{-1.79,5.99}	0.2272	1.6447	2.4400	1.5546
2	75th-90th	{-1.26,1.62}	{-1.38,2.76}	{-1.47,3.98}	0.1738	1.5148	1.6253	1.4292
5	75th-90th	{-0.93,1.08}	{-1.04,1.7}	{-1.12,2.4}	0.1344	1.3630	0.9940	1.3134
25	75th-90th	{-0.54,0.48}	{-0.65,0.7}	{-0.73,0.93}	0.1315	1.3729	0.4397	1.3088
50	75th-90th	{-0.46,0.33}	{-0.55,0.49}	{-0.62,0.67}	0.1845	1.5197	0.3566	1.4366
250	75th-90th	{-0.24,0.13}	{-0.3,0.19}	{-0.34,0.24}	0.1949	1.3655	0.2118	1.3031
1,000	75th-90th	{-0.17,0.04}	{-0.2,0.072}	{-0.23,0.095}	0.2509	1.4099	0.2305	1.3478
5,000	75th-90th	{-0.096,0.01}	{-0.11,0.027}	{-0.12,0.037}	0.1479	1.2815	0.1264	1.2378
1	90th-100th	{-2.88,3.35}	{-3.23,6.1}	{-3.46,9.27}	0.7055	2.9948	3.8439	2.7540
2	90th-100th	{-2.23,2.5}	{-2.64,4.23}	{-3.19,6.39}	0.8979	2.8173	2.7641	2.5953
5	90th-100th	{-1.42,1.42}	{-1.67,2.29}	{-1.92,3.31}	0.5158	2.2359	1.4580	2.0746
25	90th-100th	{-0.89,0.59}	{-1.07,0.92}	{-1.18,1.28}	0.4601	2.2082	0.7343	2.0209
50	90th-100th	{-0.76,0.41}	{-0.89,0.64}	{-1.05,0.88}	0.6287	2.5699	0.7431	2.3613
250	90th-100th	{-0.49,0.074}	{-0.57,0.17}	{-0.64,0.23}	0.7953	2.5803	0.7624	2.3783
1,000	90th-100th	{-0.38,-0.079}	{-0.43,-0.053}	{-0.48,-0.027}	0.7504	2.7833	0.6988	2.5551
5,000	90th-100th	{-0.28,-0.085}	{-0.29,-0.067}	{-0.31,-0.058}	0.5953	2.2540	0.5367	2.0795

Data Quality: HCC Using CY2007 (Ignore Professional Dx)

Accuracy Metrics

Group Size	R-Square	MAPE
1	10.3%	1.0073
2	16.3%	0.7568
5	28.4%	0.5764
25	69.4%	0.3006
50	72.1%	0.2150
250	90.6%	0.1192
1,000	95.5%	0.0754
5,000	97.0%	0.0517

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-1.05,1.43}	{-1.37,2.93}	{-1.93,4.78}	0.7137	1.0231	2.0944	1.0105
2	All	{-0.86,1.17}	{-1.15,2.16}	{-1.53,3.29}	0.6419	0.9437	1.4701	0.9399
5	All	{-0.74,0.93}	{-0.93,1.52}	{-1.13,2.22}	0.6016	1.0042	1.0559	1.0000
25	All	{-0.42,0.48}	{-0.56,0.73}	{-0.7,1.01}	0.6904	1.0362	0.7777	1.0357
50	All	{-0.31,0.37}	{-0.4,0.52}	{-0.49,0.69}	0.4925	0.9905	0.5554	0.9983
250	All	{-0.18,0.19}	{-0.25,0.27}	{-0.33,0.34}	0.5256	1.0101	0.5232	1.0128
1,000	All	{-0.11,0.13}	{-0.17,0.17}	{-0.23,0.21}	0.5045	0.9693	0.4894	0.9743
5,000	All	{-0.081,0.084}	{-0.13,0.11}	{-0.17,0.14}	0.4369	0.9341	0.4193	0.9374
1	0-75th	{-0.8,1.11}	{-0.9,2.35}	{-0.96,3.86}	0.2120	0.7290	1.5159	0.7281
2	0-75th	{-0.64,0.96}	{-0.73,1.78}	{-0.8,2.71}	0.1840	0.6632	1.0603	0.6800
5	0-75th	{-0.59,0.8}	{-0.7,1.29}	{-0.79,1.84}	0.2274	0.7506	0.7447	0.7594
25	0-75th	{-0.34,0.42}	{-0.42,0.62}	{-0.49,0.83}	0.2215	0.7664	0.3876	0.7820
50	0-75th	{-0.26,0.31}	{-0.33,0.45}	{-0.38,0.58}	0.2182	0.7693	0.3158	0.7809
250	0-75th	{-0.15,0.17}	{-0.19,0.23}	{-0.23,0.29}	0.2173	0.7925	0.2335	0.8012
1,000	0-75th	{-0.08,0.11}	{-0.11,0.15}	{-0.14,0.18}	0.2257	0.7617	0.2192	0.7753
5,000	0-75th	{-0.05,0.08}	{-0.085,0.11}	{-0.12,0.14}	0.2095	0.7532	0.1951	0.7646
1	75th-90th	{-1.22,1.94}	{-1.3,3.59}	{-1.39,5.52}	0.1524	1.3002	2.2021	1.2803
2	75th-90th	{-1.11,1.55}	{-1.21,2.62}	{-1.3,3.84}	0.1802	1.2921	1.5722	1.2602
5	75th-90th	{-0.97,1.2}	{-1.08,1.87}	{-1.17,2.68}	0.1554	1.3985	1.0779	1.3643
25	75th-90th	{-0.56,0.57}	{-0.66,0.84}	{-0.77,1.1}	0.1503	1.2872	0.5043	1.2496
50	75th-90th	{-0.4,0.47}	{-0.48,0.65}	{-0.56,0.84}	0.1486	1.3394	0.3924	1.3562
250	75th-90th	{-0.27,0.26}	{-0.36,0.34}	{-0.42,0.43}	0.1392	1.2952	0.2576	1.2987
1,000	75th-90th	{-0.23,0.17}	{-0.29,0.21}	{-0.37,0.25}	0.1519	1.2283	0.2274	1.2126
5,000	75th-90th	{-0.19,0.11}	{-0.24,0.13}	{-0.28,0.15}	0.1235	1.1700	0.1706	1.1525
1	90th-100th	{-2.79,3.56}	{-3.39,6.28}	{-3.75,9.66}	0.9012	2.7969	3.9618	2.7076
2	90th-100th	{-2.14,2.52}	{-2.5,4.22}	{-2.76,6.25}	0.7200	2.5349	2.5795	2.4184
5	90th-100th	{-1.41,1.68}	{-1.67,2.75}	{-2.22,3.87}	0.8933	2.3013	1.7472	2.2452
25	90th-100th	{-0.96,0.95}	{-1.18,1.42}	{-1.5,1.84}	1.0030	2.6905	1.2182	2.6246
50	90th-100th	{-0.59,0.57}	{-0.71,0.83}	{-0.84,1.06}	0.4551	2.1213	0.6108	2.0870
250	90th-100th	{-0.38,0.28}	{-0.48,0.37}	{-0.57,0.47}	0.6732	2.2140	0.6566	2.1703
1,000	90th-100th	{-0.21,0.14}	{-0.28,0.19}	{-0.32,0.23}	0.5816	2.1381	0.5354	2.1094
5,000	90th-100th	{-0.13,0.078}	{-0.15,0.1}	{-0.17,0.12}	0.4709	1.9373	0.4340	1.9105

Baseline: Age/Gender Slope using CY2007 Allowed Cost

Accuracy Metrics

Group Size	R-Square	MAPE
1	0.5%	1.0591
2	0.8%	0.8743
5	2.0%	0.6289
25	9.1%	0.3201
50	12.9%	0.2338
250	39.8%	0.1190
1,000	58.8%	0.0730
5,000	83.5%	0.0414

Uncertainty Metrics

		Confidence Intervals (as +/- adj.)			Prediction		Actual	
Group Size	Risk Score %ile	80%	90%	95%	Std Dev	Avg	Std Dev	Avg
1	All	{-0.99,1.53}	{-1.07,3.16}	{-1.12,5.1}	0.1470	0.9722	2.0488	0.9657
2	All	{-0.9,1.42}	{-0.98,2.49}	{-1.04,3.74}	0.1296	0.9933	1.4712	0.9957
5	All	{-0.76,1.04}	{-0.84,1.67}	{-0.9,2.37}	0.1287	1.0016	0.9405	0.9980
25	All	{-0.45,0.55}	{-0.52,0.81}	{-0.59,1.07}	0.1373	1.0047	0.4468	1.0056
50	All	{-0.34,0.39}	{-0.4,0.57}	{-0.46,0.76}	0.1235	0.9935	0.3304	0.9942
250	All	{-0.18,0.19}	{-0.22,0.26}	{-0.25,0.34}	0.1278	1.0025	0.2025	1.0037
1,000	All	{-0.11,0.11}	{-0.14,0.15}	{-0.16,0.2}	0.1243	1.0022	0.1613	1.0037
5,000	All	{-0.061,0.065}	{-0.08,0.099}	{-0.095,0.13}	0.1211	0.9919	0.1333	0.9921
1	0-75th	{-0.89,1.35}	{-0.92,2.96}	{-0.97,4.93}	0.0810	0.8877	2.0082	0.8802
2	0-75th	{-0.85,1.33}	{-0.91,2.41}	{-0.95,3.7}	0.0900	0.9251	1.4497	0.9252
5	0-75th	{-0.73,1.02}	{-0.8,1.66}	{-0.86,2.36}	0.0988	0.9473	0.9304	0.9435
25	0-75th	{-0.43,0.54}	{-0.51,0.8}	{-0.57,1.06}	0.0996	0.9494	0.4322	0.9508
50	0-75th	{-0.33,0.39}	{-0.4,0.57}	{-0.45,0.77}	0.0856	0.9358	0.3189	0.9382
250	0-75th	{-0.18,0.19}	{-0.21,0.26}	{-0.25,0.35}	0.0921	0.9491	0.1834	0.9505
1,000	0-75th	{-0.11,0.11}	{-0.14,0.16}	{-0.16,0.23}	0.0906	0.9505	0.1406	0.9522
5,000	0-75th	{-0.065,0.07}	{-0.083,0.11}	{-0.098,0.15}	0.0886	0.9392	0.1052	0.9389
1	75th-90th	{-1.07,1.83}	{-1.1,3.47}	{-1.11,5.24}	0.0202	1.1186	2.0440	1.1092
2	75th-90th	{-1,1.55}	{-1.05,2.56}	{-1.08,3.72}	0.0228	1.1284	1.4834	1.1282
5	75th-90th	{-0.82,1.02}	{-0.91,1.64}	{-0.96,2.32}	0.0085	1.1339	0.9153	1.1137
25	75th-90th	{-0.47,0.5}	{-0.55,0.75}	{-0.61,1.04}	0.0171	1.1490	0.4179	1.1405
50	75th-90th	{-0.34,0.38}	{-0.41,0.5}	{-0.46,0.65}	0.0181	1.1281	0.2851	1.1202
250	75th-90th	{-0.19,0.18}	{-0.22,0.24}	{-0.26,0.3}	0.0137	1.1425	0.1468	1.1337
1,000	75th-90th	{-0.11,0.095}	{-0.14,0.13}	{-0.16,0.16}	0.0167	1.1446	0.0818	1.1364
5,000	75th-90th	{-0.055,0.051}	{-0.073,0.069}	{-0.1,0.082}	0.0184	1.1216	0.0417	1.1164
1	90th-100th	{-1.17,1.95}	{-1.22,3.68}	{-1.27,5.69}	0.0647	1.2212	2.2412	1.2245
2	90th-100th	{-1.05,1.69}	{-1.11,2.8}	{-1.14,3.97}	0.0130	1.1953	1.5512	1.2195
5	90th-100th	{-0.86,1.15}	{-0.94,1.75}	{-1.01,2.47}	0.0346	1.1917	0.9803	1.2034
25	90th-100th	{-0.5,0.61}	{-0.6,0.86}	{-0.67,1.11}	0.0580	1.2318	0.4641	1.2381
50	90th-100th	{-0.37,0.43}	{-0.45,0.59}	{-0.5,0.79}	0.0434	1.1892	0.3361	1.1892
250	90th-100th	{-0.18,0.23}	{-0.23,0.3}	{-0.27,0.34}	0.0517	1.2228	0.1635	1.2374
1,000	90th-100th	{-0.11,0.14}	{-0.14,0.17}	{-0.15,0.2}	0.0431	1.2133	0.0953	1.2290
5,000	90th-100th	{-0.043,0.06}	{-0.054,0.072}	{-0.065,0.086}	0.0341	1.1889	0.0512	1.2008