

# Advanced Risk Technologies

## Decision Confidence



Milliman has helped customers manage their businesses in uncertain times for more than 60 years, and the healthcare reform environment is no exception. We are once again leading the industry by adding more value to analytical opportunities with advanced risk adjustment tools. Milliman Advanced Risk Adjusters (MARA) offers a new approach to population health risk assessment with models that perform better, deliver more intelligent scoring, and offer greater clinical transparency. MARA is the engine that can fuel health risk assessment and help customers make confident decisions in today's challenging healthcare arena.

MARA is a risk adjustment system developed with longitudinal data assets that consider disease progression and leverage advanced statistical methods. Highly effective scoring and clinical classification systems enhance analytic capabilities. Whether you are replacing an outdated product or adopting risk adjustment anew, MARA can give you deeper insight for more accurate pricing, loss-ratio improvement, profitability, and expansion of population health management.

MARA is different. The classification of medical codes underlying the MARA models is the only system designed by a collaborative team of physicians and actuaries to estimate medical risk. MARA has a proven track record and is used by more than 100 customers. The medical code classification system that it utilizes has successfully supported medical underwriting decisions for more than 15 years.

MARA is the right choice for risk action decisions that create bottom-line opportunities. Used effectively, a superior risk adjustment technology will separate the winners from the losers. The unique features of MARA are designed to help meet today's challenges:

- **Intelligent scoring** – Greater insight for resource planning by health services categories

- **Proven clinical classification system** – Offers greater detail and is easy to understand
- **Greater transparency and clinical insight** – Explains how conditions are driving individual clinical risk
- **Superior performance** – Unsurpassed predictive capability
- **Platform independent design** – Flexible and easy to operate and integrate in existing environments
- **Decision confidence** – An Analytic Guide to promote successful application of risk scoring
- **Unparalleled expertise** – A Milliman expert is just a mouse click or a phone call away

### A PROVEN CLINICAL CLASSIFICATION SYSTEM FOR PREDICTING RISK THAT ALSO SUPPORTS MEDICAL ANALYTICS

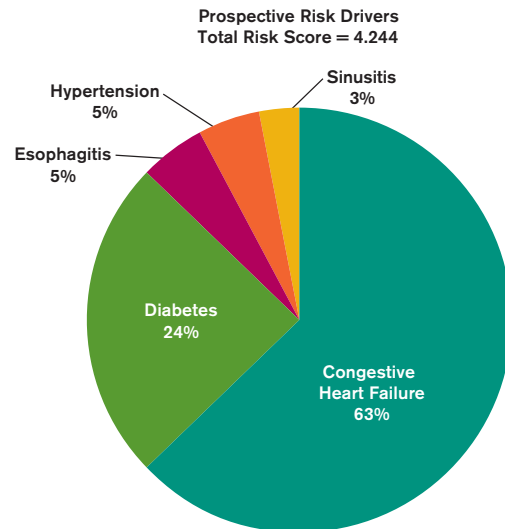
Some risk adjustment systems limit the number of condition groups when developing predictive models. While a smaller number of clinical groups can make it easier to build models, such structures may limit clinical analysis, patient stratification, and case management workflow.

More than 1,000 condition groups with clear clinical labels profile medical problems that drive risk:

- Anemia
- Congestive heart failure
- Diabetes mellitus
- Hypertension
- Osteoarthritis
- Pneumonia
- COPD
- Sinusitis
- Retinal Detachment
- Injury-rotator cuff
- Chest pain
- Back pain
- Spinal stenosis
- Cataracts
- Pregnancy
- Etc.

**GREATER CLINICAL TRANSPARENCY FOR MEDICAL MANAGERS**

MARA enhances the value of risk assessment by delivering greater transparency than other risk adjustment vendors. Clinical transparency lends more meaning to risk scores and better support to clinical decisions. MARA's clinical risk drivers offer a fresh approach in population health risk analysis. Complex case assessment and care support decisions can be made with more confidence when there is an understanding of the contributions made by medical problems. MARA reveals the percent contributions for each disease and medical condition affecting the clinical portion of risk scores.



**ACTIONABLE INSIGHT FOR CARE MANAGEMENT WORKFLOW DECISIONS**

With a total risk score of 4.24, the example individual above is sicker than average—heart disease and diabetes account for more than 50% of the expected risk in the prediction period, but other manageable conditions influence risk. MARA provides a transparent view of these clinical risk factors and how they influence expected costs and resources, which can improve risk actions and lead to reduced risks and improved quality. These advanced capabilities make MARA the best choice for clinical risk stratification and clinical workflow decisions.

**THE MOST INTELLIGENT SCORING EXPANDS THE VALUE OF RISK ADJUSTMENT**

A single risk score that captures a member's relative risk as compared with an average population is simply not enough for complex decisions, nor is it necessarily useful for care management. With healthcare decisions becoming more and more complex, it is time for risk scoring systems to evolve, too. MARA's ability to provide risk scores by key health services categories puts it ahead of the curve.

Customers can depend on MARA for more intelligent scoring. Every MARA model produces category risk scores that explain the expected resource use for key health service components, including inpatient, outpatient, emergency room, physician, drugs, and other services. MARA can help you get a better handle on the utilization of health services, adjust for risk expectations at the resource level, measure and profile efficiency by service category, and set a more accurate budget. This intelligent risk scoring system makes MARA a most valuable asset for managing decisions under healthcare reform.

**SUPERIOR PERFORMANCE**

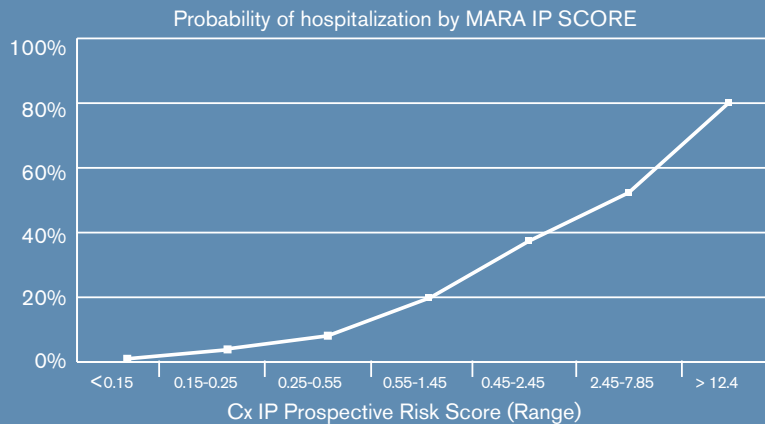
In today's healthcare reform environment, the importance of predictive accuracy is striking, especially when the use of millions or even billions of healthcare dollars will be based on risk scores. As performance measures and payments are adjusted for illness burden, model accuracy becomes a valuable asset to any healthcare entity considering payment reforms.

The superior performance of new risk adjustment models like MARA has encouraged the industry to move decisively away from demographic-based premium and payment systems. The predictive accuracy of risk adjustment models is typically judged by the R-squared (R<sup>2</sup>) statistic or the percentage of variation explained by the model. Other statistics are also important to consider, such as mean average prediction error (MAPE), predictive ratios (PRs), or ratios of the mean predicted to mean actual expenditures for biased subsets of populations, such as a disease cohort, groups of employers, or providers.

**“MARA’s clinical risk drivers are the ‘jewel’ in helping us understand the effect of medical problems on risk in a way we never understood with other vendors’ tools.”**  
– PCMH clinical case manager

### MARA'S INPATIENT RISK SCORES AND ADMISSIONS ARE HIGHLY CORRELATED

The prospective inpatient (IP) risk score is not only a strong predictor of overall inpatient costs but also does very well in predicting actual admissions.



*The findings of an independent pre-post study of admissions showed a strong correlation between MARA's calculated prospective IP score and the proportion of people with that score who actually had a hospitalization. In other words, the higher the IP score, the greater is the likelihood of actual hospitalization. When there is a need to reduce hospital admissions, an IP risk score can be a powerful stratification variable for medical management workflow.*

Recent performance evaluations prove the value of MARA risk adjustment models when compared with well-known competitors. In a client-sponsored model evaluation, MARA outperformed competitor models in critical areas:

- A higher R<sup>2</sup> and lower MAPE
- Superior performance in every level of risk stratification
- IP Score is highly correlated with likelihood of hospital admissions for key disease groups
- Better suited for high-cost case predictions

In a simulation of the 2007 Society of Actuaries study of claims-based risk-adjustment vendors, MARA models also outperformed competitor entries, with higher R<sup>2</sup> and lower MAPE.

### TECHNICALLY FRIENDLY, FLEXIBLE SOFTWARE

MARA is quick to install and highly flexible when a tight integration is needed for automated processing and reporting. System-independent and component-based design allows for deployment in diverse technology environments. The user-friendly design of the MARA software means that no additional third-party products are required for operations.

Operating System	MARA Supported
Windows	✓
UNIX	✓
Linux	✓
Integration	
.NET API	✓
Java API	✓
Web Service	✓

**Do you want a more comprehensive profile of risk and clinical information? MARA helps you put it all together: Scores, conditions, and clinical risk drivers**

- **Concurrent and prospective risk**
- **Transform the IP score to a probability of hospitalization**
- **Flag conditions on the STAR or AHRQ list of “avoidable” for admission**
- **Convert scores to dollars**



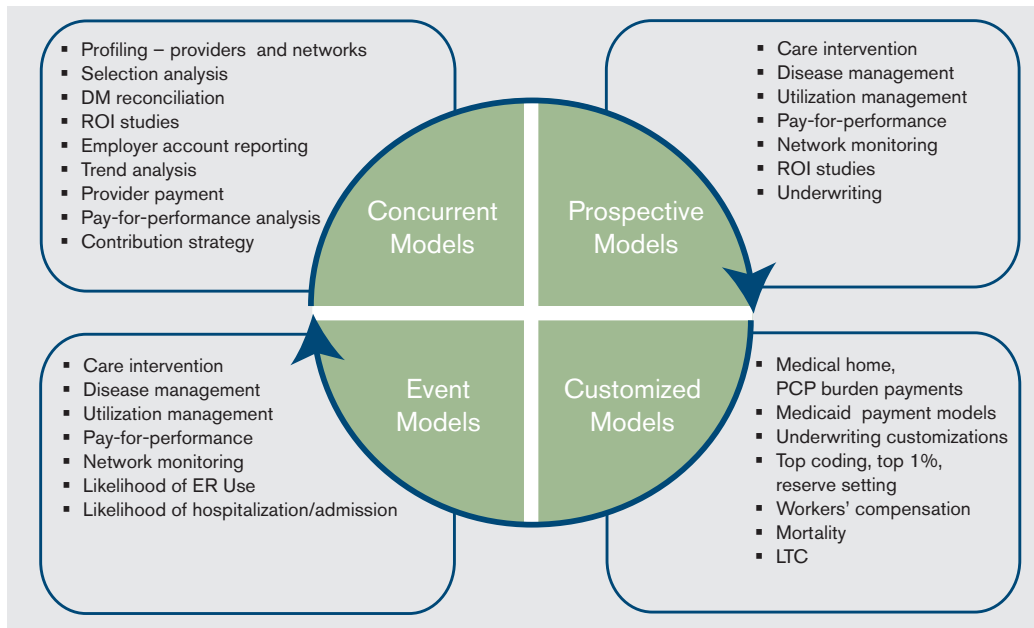
**BACKED BY EXPERT ADVICE FOR CONFIDENT APPLICATIONS OF RISK ADJUSTMENT**

Risk adjusters and predictive models inform a wide range of healthcare decisions and applications, many of which are shown here. Risk adjusters are optimal only when applied effectively. As a full-service actuarial and consulting firm, Milliman brings a comprehensive understanding of the application of risk adjustment and predictive modeling to complex healthcare applications.

**REACHING FULL POTENTIAL**

Whether the need is for risk adjustment tools, strategic advice, or customized models, Milliman’s knowledgeable consultants and actuaries are always available to help design and deliver successful solutions.

Milliman is among the world’s largest providers of actuarial and related products and services. The firm has consulting practices in healthcare, property & casualty insurance, life insurance and financial services, and employee benefits. Founded in 1947, Milliman is an independent firm with offices in major cities around the globe. For further information, visit [milliman.com](http://milliman.com).



For more information about MARA or to schedule a demonstration of the software, email us at [MARA@Milliman.com](mailto:MARA@Milliman.com) or contact your Milliman consultant.

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