3M Health Information Systems

3M™ Clinical Risk Groups: At work in the real world

Overview

First released in 2000 as clinically-based classifications for measuring a patient's burden of illness, **3M Clinical Risk Groups (CRG)** have steadily evolved into a widely-used risk-adjustment tool applied to many of today's most complex, real-world challenges in health care. 3M CRGs have been put to work in diverse healthcare sectors by payers, providers and researchers— anyone who needs to account for clinical complexity in patient data.

With the transition to value-based reimbursement, the ability to unpack clinical complexity can make a significant difference for healthcare organizations of all types. For example, if you have deep insights into clinical complexity, you can distinguish between patients who may share the same diagnosis but differ widely in their severity of illness, overall health status and their projected use of healthcare resources. Such insight provides a clear advantage on various fronts, including resource planning and utilization as well as case management and disease intervention.

From the start, 3M CRGs were also meant to be cost-effective and easy to apply. CRGs rely on standard claims and encounter data as well as pharmaceutical codes and functional health status, when this information is available. All of this data is collected longitudinally so each individual can be assigned to a single, mutually exclusive risk category.

But 3M CRGs deliver more than simple risk-adjustment. Today's healthcare marketplace offers numerous risk-adjustment solutions, each of which has its own approach and intended purpose. However, an independent evaluation[1] concluded that 3M CRGs performed more favorably than other major risk-adjustment methodologies in these three areas:

- **Clinical relevance**: Including the clinical and administrative value of categories, face value or clinical relevance and level of granularity— particularly for epidemiological applications
- **Resource prediction**: Including the discrimination and predictive value of risk categories as well as the accuracy and precision for predicting cost
- **Convenient resource weighting**: Including the transparency, ease of use and simplicity of calculating weights

After a brief introduction of the 3M CRG methodology, this paper offers practical examples of how healthcare organizations, including commercial accountable care organizations (ACO), Medicaid managed care (MMC) systems, large urban hospitals and a specialized cancer research facility have all used 3M CRGs to accomplish a variety of goals.

Finally, this paper summarizes the distinct advantages that 3M CRGs offer to payers, providers and researchers, all of whom understand what's at stake if they select a sub-par risk-adjustment methodology. When risk is not accounted for accurately, an organization may have inadequate resources to care for the needs of its population—a situation that puts its care efforts and communities at even greater risk.

When you have deep insights into clinical complexity, you can distinguish between patients who share the same diagnosis but differ widely in their severity of illness, overall health status and their projected use of healthcare resources.

What is this type of insight worth to your organization?

What are 3M CRGs?

3M CRG methodology is a categorical clinical model that uses standard claims data (i.e., inpatient, ambulatory and pharmaceutical) to assign each patient to a single, mutually exclusive risk category. With version 2.0, released in April 2016, there are now 330 base CRGs. Many of these CRGs have multiple levels of severity of illness (SOI), resulting in 1,408 potential discrete 3M CRG assignments. The number of CRGs have been expanded to provide more granularity or specificity. This allows organizations to easily identify severity (e.g., morbid obesity vs. obesity, not otherwise specified). The expansion also makes it possible to distinguish conditions in pediatrics and provide more specificity for chronic conditions and co-morbidities, especially those involving malignancies, mental health, substance abuse and HIV.

3M CRGs also use available pharmaceutical data and functional health status information to further stratify a patient's SOI, which is crucial for an illness such as stroke, when the diagnosis alone does not provide adequate information.

The **3M™ CRG Software** applies expert clinical logic to assign each patient to a single risk group. Each individual 3M CRG represents foundational information for both payment and care coordination. 3M CRGs are clinically based, meaning they create a common language that links the clinical and financial aspects of care so clinicians and non-clinicians can understand the information.

Each 3M CRG is clinically meaningful and can be used to:

- Predict future healthcare utilization and cost (prospective or concurrent)
- Explain past healthcare utilization and cost (retrospective)

With 3M CRGs, you can identify clinically meaningful groups of individuals who require similar amounts and type of resources. Unlike Diagnosis-Related Groups (DRGs), 3M CRGs aren't limited to inpatient resources used during a hospitalization. Instead, they also factor in the total services, drugs and equipment ordered in multiple care settings for a patient over any period of time.

In addition, 3M CRGs are not limited to a Medicare population. They also describe a wide range of other populations, including children, low-income individuals, the elderly and those who are disabled or mentally ill. 3M CRGs also capture commercially-insured and employer-sponsored populations.

Addressing clinical data and costs

Organizations that license 3M CRGs can associate their own appropriate relative payment weights with each 3M CRG category. Within the 3M CRG system, these relative weights are calculated independently of the clinical model. Since organizations usually derive the weights empirically from actual historical payer expenditures, payment weights reflect actual practice patterns.

More importantly, **changes to these weights don't impact the 3M CRG clinical model**. When payment models change because of healthcare reform mandates, practice patterns or shifting technologies, 3M CRGs remain a consistent clinical model. Compare this approach with a typical statistical model in which payment weights are a co-efficient or factor of the algorithm itself. Any changes to the payment weights inherently change the predictive model as well. This is not the case with 3M CRGs.

Outlier thresholds are also established for each 3M CRG clinical category. Patients who exceed expected resource utilization can distort profiles and lead to large payment losses. These outliers can be capped within the 3M CRG Grouping Software.

Focused on the patient, not a disease

One of the characteristics of 3M CRGs is that they center on a patient's total burden of illness and not on a specific disease or service. In addition, 3M CRGs:

- Account for all co-morbidities
- Measure health status over a period of time (typically a year)
- Assign less significance to time-limited acute diseases
- Effectively represent how chronic disease affects post-acute resource use

3M CRGs at work for providers

Accounting for clinical complexity requires that you identify patients with chronic illnesses and multiple problems. But more than simply identifying them, you must recognize that patients with the same illness may have different levels of severity. In terms of stratification, predictive modeling and case management, 3M CRGs are up to the challenge.

Risk-stratify populations for better case management: Denver Health

Denver Health is an integrated, safety-net care system and Level 1 trauma center for the Rocky Mountain region. Working with a $19.8 million award from the Center for Medicare and Medicaid Innovation (CMMI), Denver Health embarked on the implementation of a population health approach to delivering primary care.

Denver Health's challenge centered on its existing model for patient segmentation. In short, its system lacked sufficient clinical relevance for care coordination based in primary care. The following are some examples of where the system specifically broke down:

- Individuals with the same risk score were often clinically heterogeneous
- Small changes in clinical indicators triggered unstable tier assignments, making longitudinal care coordination difficult
- The model didn't distinguish avoidable from less avoidable utilization
- Super-utilizers were identified after the fact—not predictively

The solution became clear: Denver Health needed to replace the Chronic Illness and Disability Payment System (CDPS) risk-scoring tool with 3M CRGs.

In a recently published paper,[2] Denver Health researchers explain all aspects of its major population health transformation, including how applying 3M CRGs to its tiers significantly impacted its ability to intervene at the primary care level.

The results? Denver Health validated the predictive capabilities of 3M CRGs and integrated the methodology into its tiering algorithm. Denver Health concluded that 3M CRGs:

- Effectively predict health risk
- Align closely with clinical interventions
- Provide detailed financial stratification
- Represent risk in a way that is easily understood and accepted by clinicians

3M CRGs at work in population health for payers, providers and ACOs

Clinical complexity presents a challenge for population health management, regardless of whether you are a payer, provider or part of an ACO. In your populations, some individuals are healthy while others may have multiple comorbidities. No two patients are exactly alike, including those with the same diagnosis. Each patient has distinct healthcare needs, depending on his or her health status. Population health management—including equitable payment—requires that providers take this clinical complexity into account.

3M CRGs provide a comparative and detailed population-based understanding of disease severity. That's why organizations can use the methodology to design care coordination strategies and identify best practices to control costs, maintain quality and improve outcomes.

In addition, 3M CRGs also help organizations:

- Minimize financial incentives for treating low-cost patients
- Set fair rates to discourage adverse risk selection
- Reward cost-effective treatment of high-risk individuals
- Align best practices with reimbursement
- Profile utilization patterns and the appropriateness of capitation rates

The following examples illustrate how 3M CRGs assist a variety of organizations making the transition to value-based care and population health management.

Managed care: New York State Department of Health and New York State MMC

New York State Medicaid serves 4.5 million beneficiaries. In 2006, the New York State Department of Health (DOH) assisted the state's MMC in developing a new payment methodology. Both organizations used 3M CRG Software to assign a 3M CRG to every Medicaid member and to risk-adjust the premium a managed care plan received from the DOH, with regional cost adjustments made across the state.

The 3M CRG data was used in parallel with analytics software to produce a set of weights for dynamic fee schedules to reimburse claims for New York State MMC. The result was a standardized, uniform fee structure that replaced earlier contracts that included highly-variable pricing between MMC plans and its providers.

The 3M CRG distribution of the MMC plan's Medicaid population can be analyzed to support case management, network design and provider relations. The information is used to forecast a health plan's MMC revenue and medical costs in the next year as well as for predictive modeling at the patient level to support disease management. For example, 3M CRGs can be used to predict the clinical and financial implications of a change in the severity of disease, a change in treatment or the onset of another condition.[3]

The 3M CRGs enabled the state to shift payment toward a case-mix model.

The state has also begun to shift more medically-complex populations into managed care. This is a significant challenge, given the financial risks to managed care organizations. However, the leadership of New York State DOH has observed 3M CRGs at work long enough to be confident that the methodology can handle the complexities of members who are dual eligible or who have behavioral health or substance abuse problems. In 2012, 3M CRGs began to be used to assign New York Medicaid beneficiaries to health homes.[4]

Care management: Blue Cross® Blue Shield® of Nebraska

For many years, Blue Cross Blue Shield of Nebraska (BCBSNE) couldn't identify its at-risk members unless care management nurses and the analytics team performed a resource- and time-intensive manual claims review to identify hospital costs, utilization trends and catastrophic events.

But even with this painstaking process, BCBSNE was not convinced it had a comprehensive patient list that truly captured members who were most at risk. One last big drawback: The data didn't identify the individuals with the highest cost—a key factor in any value-based care program.

If BCBSNE was going to make any progress with its care management program—and positively impact healthcare value and outcomes—the organization needed the ability to predict members who had persistent high needs. The insurer engaged with 3M Health Information Systems to identify persistent high-need individuals using a predictive model based on 3M CRGs and other measures

Previously, BCBSNE identified at-risk members as those who had suffered a catastrophic event with a resulting hospital stay. However, using 3M CRGs, BCBSNE soon discovered that its true at-risk members weren't those with an acute crisis or hospital stay, but rather they were members who were likely to continue needing frequent or high-cost care.

According to a BCBSNE senior director, its previous data-gathering and analysis process would never have revealed this level of insight into its at-risk populations. Without the use of 3M predictive analytics as well as data that was risk-adjusted with 3M CRGs, BCBSNE may have continued to miss this vital information.[5]

Commercial ACO: Wheaton Franciscan Healthcare-Iowa and Wellmark® Blue Cross® and Blue Shield® of Iowa

Population health management is far more complex for commercial ACOs than it is for payers and providers. That's because there are many more information technology systems to integrate and data sets to aggregate and risk-adjust. ACOs definitely need risk-adjusted data to establish equitable measurements of performance among its various providers and also build appropriate reimbursement incentives.

Wellmark Blue Cross and Blue Shield of Iowa (Wellmark) launched one of the first ACOs in the Midwest. Wellmark is a long-time user of two other 3M methodologies: the **3M™ All Patient Refined DRG (APR DRG) Classification System** for accurate measurement of inpatient care and costs, and the **3M™ Enhanced Ambulatory Patient Grouping (EAPG) System** for implementing a new outpatient payment approach. Wellmark turned to 3M again for analytics, tools and guidance to meet its value-based care objectives for a new shared savings payment model.

Wellmark developed a standardized ACO contract for health systems and primary care practices that included an approach for member attribution, a model for shared savings, financial targets and a quality incentive payment based on the **3M℠ Value Index Score (VIS)**, a quality measure linked to shared savings and quality incentive payments. Using 3M's online dashboard, Wellmark gave analytic tools and risk-adjusted data on costs, quality and population health status to analysts and physicians in all its ACOs. This data is available through the dashboard and uses 3M APR DRGs, 3M CRGs, potentially preventable events, total cost of care metrics and the 3M VIS.

Within one year of joining the shared-savings payment model, one of the ACOs, Wheaton Franciscan Healthcare-Iowa, met and exceeded its quality goals. As a result, the ACO earned an incentive payment and a share in savings. After two years, the Wellmark shared-savings payment model also showed favorable results. The initial five ACOs had improved their quality scores by more than 35 percent and saved more than $12 million during the first two years. [6]

MMC and a Pioneer ACO: Montefiore Care Management

A January 2016 article features Montefiore Medical Center in New York City, one of the Centers for Medicare & Medicaid Services' (CMS) Pioneer ACO participants and an active user of 3M CRGs.[7]

Under CMS' Pioneer ACO Model program, participants must report on quality and patient satisfaction measures while lowering Medicare costs. To be successful, the Montefiore ACO needed to:

- Target at-risk members for care management
- Measure quality of care and health outcomes
- Quantify program costs and savings
- Determine the effectiveness of its care management programs

For Montefiore, the challenge began with reducing hospital readmissions. Henry Chung, MD, vice president and chief medical officer of Montefiore's care management program and medical director of the ACO, appreciated the fact that 3M CRGs are categorical in nature and can place every patient in a clear hierarchy. As a physician, he quickly realized how 3M CRGs allowed users to drill down into patient data and see what was really going on with any given patient's health status.

Dr. Chung collaborated with the Montefiore IT team to integrate data from its electronic health record (EHR) with claims data and then run it through the **3M CRG Software** to stratify high-risk patients who were being discharged.

After digging into the analytics that the 3M tools provided, Montefiore could take targeted and purposeful approaches to the issues that were discovered. For example, centralized discharge transition plans were created in which nurses regularly contact discharged patients to assess how they are doing, to make sure they take prescription medications correctly, and to confirm their next physician appointment.

The 3M CRGs also helped Montefiore go beyond its Medicare population and stratify all ACO patients into risk categories. This allowed the ACO to identify patients who require more expedited care to avoid a hospital admission.

In addition to measuring quality and health outcomes, the Montefiore ACO also tracks the total cost of care for its attributed population. Through the ACO's focus on care coordination, quality of care and health outcomes, the result was a gross savings of 3.6 percent in 2014 and an average gross savings of nearly six percent over the first three years.

Clinical complexity presents a challenge for population health management, regardless of whether you are a payer, provider or part of an ACO. In your populations, some individuals are healthy while others may have multiple comorbidities. No two patients are exactly alike, including those with the same diagnosis.

3M CRGs at work for proven effectiveness measuring special populations

Special populations often have unpredictable hospital utilization due to the nature of their medical and non-medical problems. Variability also leads to the greatest risks for high costs and makes it more difficult to:

- Predict resource demands, including costs related to facilities, equipment and staffing
- Standardize care plans
- Manage risk-sharing agreements

The following examples of 3M CRGs at work in special populations—cancer patients and medically-complex children—reveal the methodology's ability to be relevant, predictive and transparent for measuring patient health risk.

Risk-stratify populations for oncology research: Memorial Sloan Kettering Cancer Center

When your organization is laser-focused on cancer patients, as Memorial Sloan Kettering (MSK) Cancer Center is, you need to effectively measure the outcomes for patients who are treated at different types of hospitals, even without the addition of cancer registry data. Cancer researchers have long known that where a cancer patient is treated can significantly impact the patient's survival rate. However, measuring outcomes is difficult, because the administrative data from Medicare claims does not include information about the stage of a patient's cancer.

Outcomes data isn't entirely reliable even when using it to compare two equally-reputable hospitals. That's because this data doesn't take into consideration whether one of the hospitals treats more critically-ill patients

or those with advanced-stage cancers. Hospitals that treat more clinically complex patients will likely have lower survival rates.

Researchers at MSK Cancer Center decided to forge ahead and rank four major types of cancer hospitals in the United States according to the long-term survival rates of each hospital's patients. Ultimately, researchers found that using 3M CRGs to risk-adjust Medicare claims data proved to be accurate enough for calculating long-term survival rates among four major categories of hospitals. A summary of their research was published on October 8, 2015 in the JAMA Oncology.[8]

For the study, MSK researchers used the 3M CRG Software to risk-adjust two data sets: (1) Fee-for-service Medicare claims with no information about cancer stage (including both inpatient and outpatient cancer care from office visits, chemotherapy, radiation, and home care), and (2) the Surveillance, Epidemiology, and End Results (SEER) Medicare database (including information on cancer stage). The researchers then analyzed both risk-adjusted data sets to calculate the probability of death at each hospital. They then ranked the hospitals in terms of three- and five-year survival rates.

Researchers concluded that while potentially significant differences in outcomes exist between the diverse types of hospitals providing cancer treatment, the risk adjustment performed on both sets of data clearly shows the inclusion of the cancer stage information does not greatly impact hospital rankings. This type of insight into the data on long-term survival may prove helpful going forward as a means of creating value-based payment strategies to connect quality outcomes with reimbursement.

Risk-stratify populations for medically complex children: Children's Hospital Association

When the need arose for Children's Hospital Association (CHA) to stratify its pediatric population according to SOI, expected utilization and major functional limitations, 3M CRGs were the measurement of choice. That's because 3M CRGs have purposely included pediatrics since the system was created in 2000. The organization formerly known as the National Association of Children's Hospitals and Related Institutions (NACHRI) co-developed 3M CRGs with 3M. Subsequently, CHA has also collaborated with 3M in the further development and refinement of the 3M CRG classification system. Because 3M CRGs measure how SOI and resource use change over time, they provide a valuable way to gauge how effectively a health system maintains the health of a patient population.

The CHA set out to evaluate the rate at which children with and without chronic conditions move into the Illinois fee-for-service Medicaid system and the Children's Health Insurance Program (CHIP) between 2007 and 2010, years that include the Great Recession. The children's records were assigned to five chronic condition groups using 3M CRG Software. Researchers looked for these three outcome measures:

1. Change in the recipient number in each chronic condition category
2. Total and per-capita spending changes within various categories of service
3. Changes in service utilization

The results of the study were published in the journal *Pediatrics* in 2014.[9] After analyzing the risk-adjusted data, the authors of the study noted the following:

● Children with chronic conditions entered the Illinois Medicaid and CHIP systems at a higher rate than children without chronic conditions (26.7 percent versus 14.5 percent)

● Average spending (after adjustments for inflation) decreased in a linear trend in all chronic condition categories except malignancy

● In all condition categories, per member inpatient and emergency department service use decreased, and outpatient service use increased

● Average inpatient length of stay decreased in all chronic condition groups except for children without chronic conditions

Researchers also noted that between 2007 and 2010, a disproportionately substantial number of children with chronic conditions received healthcare services as Illinois Medicaid and CHIP members. However, researchers concluded that the total increase in spending resulted from a greater number of recipients with the most complex chronic conditions—and not because of increased per-member spending.

3M CRGs helped CHA researchers group patient data into accurate clinical categories so they could stratify costs by severity level and the complexity of care. Insights gleaned from using 3M CRGs can help payers and providers develop strategies for care management, design networks and implement disease management programs.
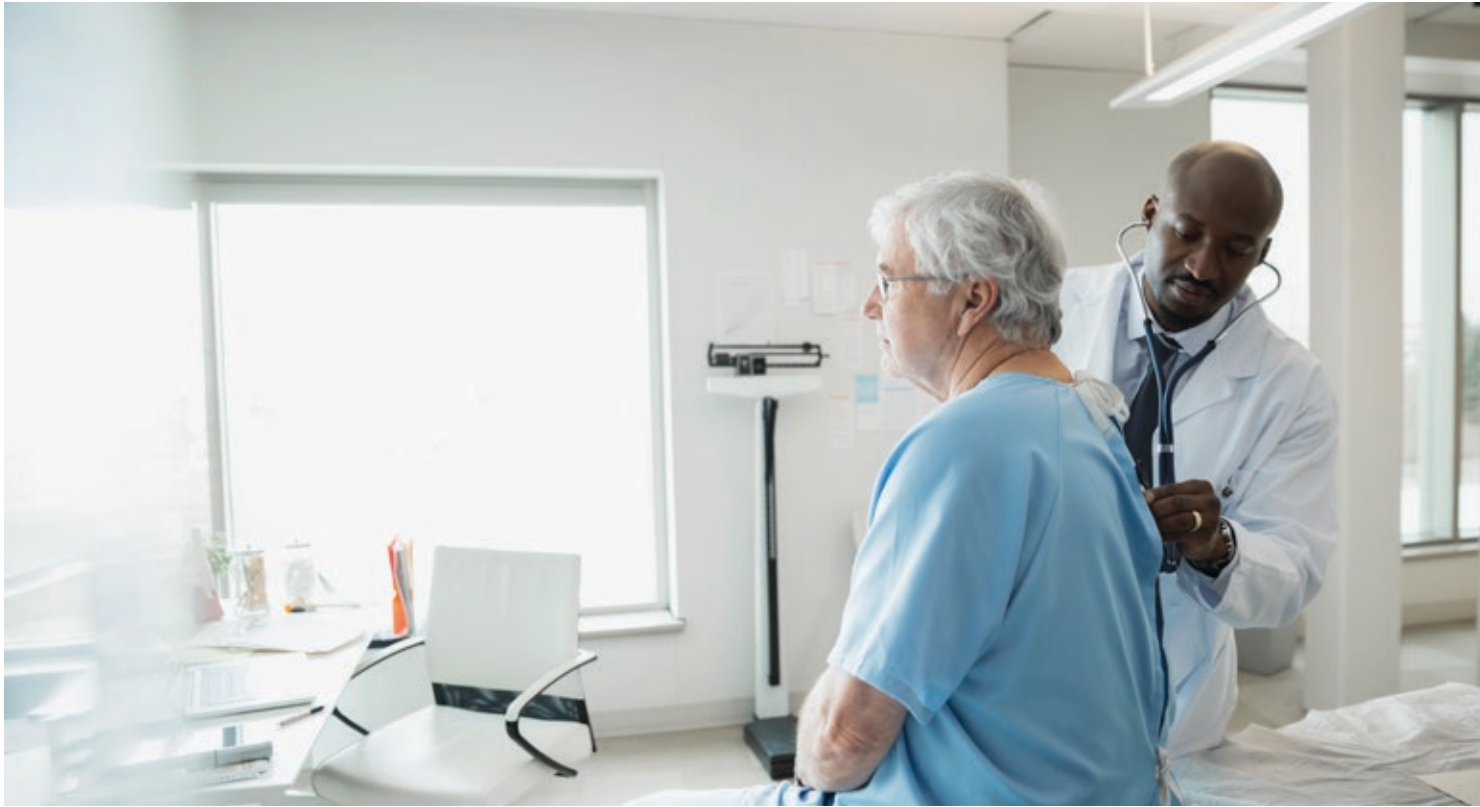
Conclusion: When it comes to risk measurement tools, choose wisely

Payer and provider organizations aren't the only users that apply 3M CRGs to payment design and analytics. 3M Health Information Systems' own product teams have incorporated 3M CRGs into the data sets, dashboards, predictive models and other analytics tools at work today within the **3M℠ Healthcare Transformation Suite**. 3M CRGs provide the foundational risk-adjustment for the population data 3M uses with its own clients.

The 3M CRG methodology is the only health risk methodology that includes all of the following five characteristics:

1. Clinical model based on diagnoses, procedures, drug codes, functional and mental health status
2. Ability to assign each patient to a single, mutually-exclusive category
3. Patient severity level based on the interaction of all of a patient's chronic diseases
4. Ability to compare types and amounts of services within the same category (i.e., clinically-similar individuals)
5. Data that accurately represents pediatric populations thanks to collaboration with the CHA

On one level, you can say that 3M CRGs quantify what many clinicians already know—that their sickest patients require the most resources. However, 3M CRGs quantify this data in such a way that care managers and clinicians can use the information to develop effective interventions, and administrators can target and reduce the costs that threaten their systems. In the end, 3M CRGs help healthcare organizations achieve the Institute for Healthcare Improvement's 'triple aim:'

1. Improve the patient experience of care (including quality and satisfaction)
2. Improve the health of populations
3. Reduce the per capita cost of health care

When it comes to understanding patient populations, organizations often don't know what they don't know. The same is true of risk-adjustment: If you don't select the best analytics and tools available, you may not get the results—both clinical and financial—for which you'd hoped. Even worse, you'll be unprepared to meet your patients' healthcare needs going forward.

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Footnotes

[1] Marc Belinguet, Colin Preyra, and Stafford Dean, *Comparing the Value of Three Main Diagnostic-Based Risk-Adjustment Systems*, Canadian Health Services Research Foundation, March 2005.

[2] Tracy L. Johnson, Daniel Brewer, Raymond Estacio, Tara Vlasimsky, Michael J. Durfee, Kathy R. Thompson, Rachel M. Everhart, Deborah J. Rinehart, and Holly Batal, "Augmenting Predictive Modeling Tools with Clinical Insights for Care Coordination Program Design and Implementation," *eGEMs* (2015): Vol. 3: Issue1, Article 14. Accessed June 2017 at http://dx.doi.org/10.13063/2327-9214.1181.

[3] Lawrence Borok, "The Use of Predictive Modeling by New York Medicaid—A payment system based on risk group predictive modeling since 2008". Accessed October 2016 at http://www.ehcca.com/presentations/predmodel5/borok_2.pdf.

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[5] To read the entire 3M case study on BCBS of Nebraska, visit: http://multimedia.3m.com/mws/media/1141608O/3m-bcbs-nebraska-case-study.pdf.

[6] To read the entire 3M case study on Wellmark and Wheaton, visit: http://multimedia.3m.com/mws/media/1032705O/3m-vis-wellmark-wheaton-case-study.pdf.

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