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Solventum™ Clinical Risk Groups (CRGs) Classification System:

At work in the real world

Overview

First released in 2000 as clinically-based classifications for measuring a patient's burden of illness, Solventum CRGs have steadily evolved into a widely used risk adjustment tool applied to many of today's most complex, real-world challenges in healthcare. Solventum 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 (SOI), 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, Solventum CRGs were also meant to be cost-effective and easy to apply. They 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 Solventum 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. Here are the key differentiators of Solventum CRGs:

- **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 Solventum CRG methodology, this paper offers practical examples of how healthcare organizations, including commercial accountable care organizations (ACOs), Medicaid managed care (MMC) systems, large urban hospitals and a specialized cancer research facility have all used Solventum CRGs to accomplish a variety of goals.

Finally, this paper summarizes the distinct advantages that Solventum CRGs offer to payers, providers and researchers, all of whom understand that when risk is not accounted for accurately, an organization may have inadequate resources to care for the needs of its population.

When you have deep insights into clinical complexity, you can distinguish between patients who share the same diagnosis but differ widely in their SOI, overall health status and their projected use of healthcare resources. What is this type of insight worth to your organization?

What are Solventum CRGs?

The Solventum 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. There are more than 330 base CRGs, many of which have multiple levels of SOI, resulting in more than 1,300 potential discrete Solventum CRG assignments. This granularity allows organizations to easily identify severity (e.g., morbid obesity vs. obesity, not otherwise specified), distinguish conditions in pediatrics and provide more specificity for chronic conditions and comorbidities, especially those involving malignancies, mental health, substance abuse and HIV.

Additionally, Solventum CRGs use available pharmaceutical and functional health data 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.

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

Each Solventum CRG is clinically meaningful and can be used to:

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

With Solventum CRGs, you can identify clinically meaningful groups of individuals who require similar amounts and types of resources. Unlike diagnosis related groups (DRGs), Solventum 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, Solventum 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 people who have a disability or mental illness. Solventum CRGs also capture commercially insured and employer-sponsored populations.

Addressing clinical data and costs

Organizations that license Solventum CRGs can associate their own appropriate relative payment weights with each Solventum CRG category. Within the Solventum 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 Solventum CRG clinical model. When payment models change because of healthcare regulations, practice patterns or shifting technologies, Solventum CRGs remain a consistent clinical model. Compare this approach with a typical statistical model in which payment weights are a coefficient 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 Solventum CRGs.

Focused on the patient, not a disease

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

- Account for comorbidities
- 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

Solventum 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, Solventum CRGs are up to the challenge.

Risk stratification: 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 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 Solventum CRGs.

In a paper, Denver Health researchers explained all aspects of its major population health transformation, including how applying Solventum CRGs to its tiers significantly impacted its ability to intervene at the primary care level.[1]

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

Solventum 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 individual health status. Population health management — including equitable payment — requires that providers take this clinical complexity into account.

Solventum 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, Solventum CRGs also help organizations:

- 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 Solventum CRGs assisted a variety of organizations with the transition to value-based care and population health management.

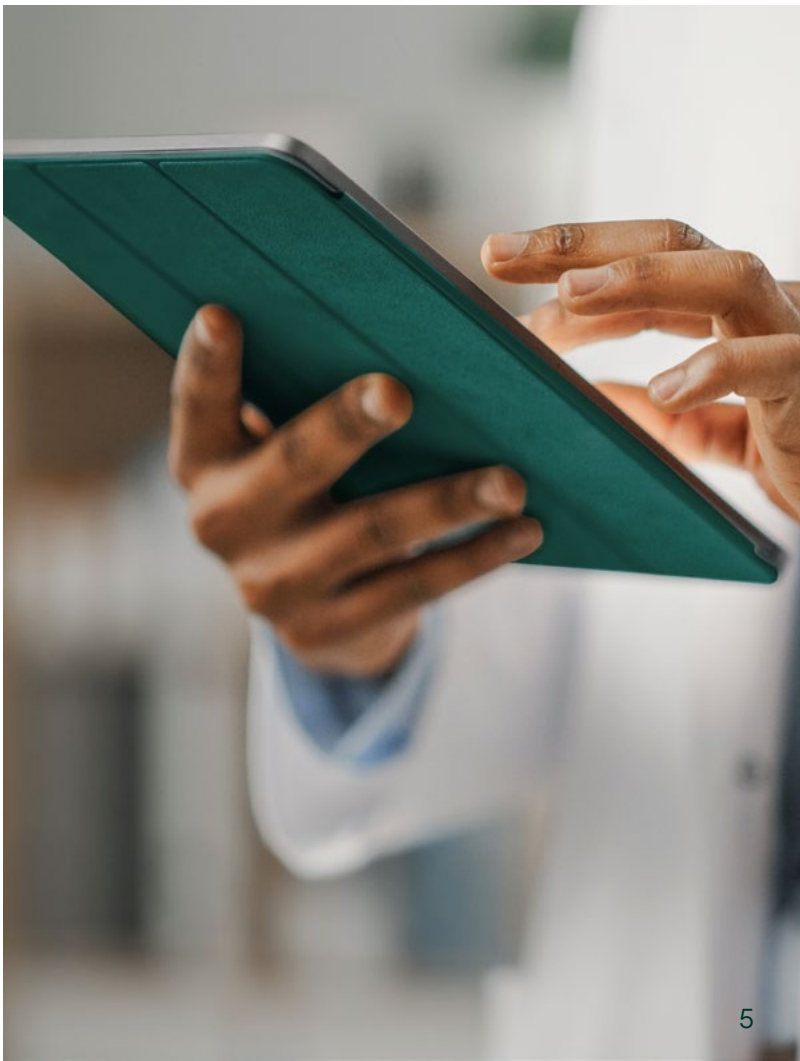
Managed care: New York State Department of Health and New York State MMC

New York State Medicaid serves millions of 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 Solventum CRGs to assign a CRG to every Medicaid member and to risk adjust the premium from the DOH, with regional cost adjustments made across the state.

Solventum 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 providers.

The Solventum CRG distribution of the MMC plan's Medicaid population could be analyzed to support case management, network design and provider relations. The information could also be 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, Solventum 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.[2]

Solventum CRGs enabled the state to shift payment toward a case mix model. In 2012, Solventum CRGs also began to be used to assign New York Medicaid beneficiaries to health homes.[3]



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 of care — 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 Solventum to identify persistent high-need individuals using a predictive model based on Solventum 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 Solventum 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, the organization's previous data gathering and analysis process did not reveal this level of insight into its at-risk populations. Without Solventum predictive analytics as well as data that was risk adjusted with Solventum CRGs, BCBSNE may have continued to miss this vital information.

Population health: 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 due to the number of information technology systems to integrate and data sets to aggregate and risk adjust. ACOs need risk adjusted data to establish equitable measurements of performance among various providers and 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 Solventum methodologies: the Solventum™ All Patient Refined Diagnosis Related Groups (APR DRGs) Classification System for accurate measurement of inpatient care and costs and the Solventum™ Enhanced Ambulatory Patient Groups (EAPGs) Classification System for implementing a new outpatient payment approach. Wellmark turned to Solventum 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 Solventum™ Value Index Score (VIS), a quality measure linked to shared savings and quality incentive payments. Using Solventum'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 was made available through the dashboard and included Solventum APR DRGs, Solventum CRGs, potentially preventable events, total cost of care metrics and the Solventum 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 improved their quality scores by more than 35% and saved more than $12 million during the first two years.*

Care management: Montefiore ACO

The Montefiore ACO in New York City was one of the Centers for Medicare & Medicaid Services (CMS) Pioneer ACO Model participants — and an active user of Solventum CRGs.[4]

Under the Pioneer ACO Model program, which took place from 2012-2016, participants 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 care management programs

*Solventum internal data on file.

For Montefiore, the challenge began with reducing hospital readmissions. Dr. Henry Chung, vice president and chief medical officer of Montefiore's care management program and medical director of the ACO, appreciated that Solventum CRGs are categorical in nature and can place every patient in a clear hierarchy. As a physician, he quickly realized how Solventum 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 Solventum CRG software to stratify high-risk patients who were being discharged.

Digging into the analytics provided by the Solventum tools enabled Montefiore to develop targeted and purposeful approaches to address uncovered issues. For example, the organization created centralized discharge transition plans whereby nurses regularly contacted discharged patients to assess how they were doing, make sure they were taking prescription medications correctly and confirm their next physician appointment.

Solventum 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 required more expedited care to avoid a hospital admission.

In addition to measuring quality and health outcomes, the Montefiore ACO also tracked the total cost of care for its attributed population. The ACO's focus on care coordination, quality of care and health outcomes resulted in gross savings of 3.6% in 2014 and average gross savings of nearly 6% 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.

Proven effectiveness in 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 Solventum 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 stratification for oncology research: Memorial Sloan Kettering Cancer Center

When your organization is laser-focused on cancer patients, as is Memorial Sloan Kettering (MSK) Cancer Center, you need to effectively measure the outcomes for patients who are treated at different types of hospitals. 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 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 Solventum CRGs to risk adjust Medicare claims data proved accurate enough for calculating long-term survival rates among four major categories of hospitals.[5]

For the study, MSK researchers used Solventum CRGs 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 existed between the diverse types of hospitals providing cancer treatment, the risk adjustment performed on both sets of data showed the inclusion of cancer stage information did not greatly impact hospital rankings. This type of insight into data on long term survival may prove helpful when creating value-based payment strategies to connect quality outcomes with reimbursement.

Risk stratification 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, Solventum CRGs were the measurement of choice. That's because Solventum 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 Solventum CRGs with Solventum. Subsequently, CHA has also collaborated with Solventum in the further development and refinement of the Solventum CRG Classification System. Because Solventum 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 moved 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 Solventum CRGs. Researchers looked for these three outcome measures:

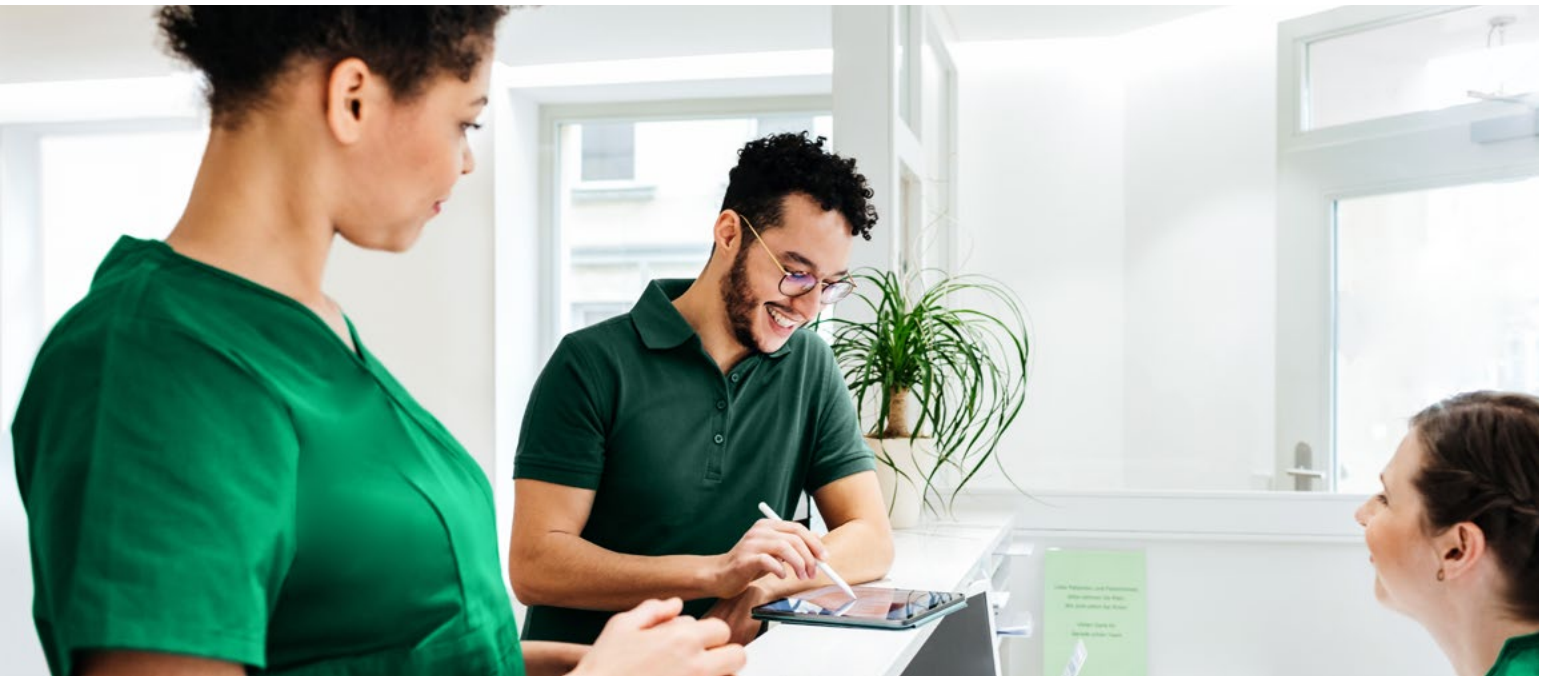
1. Change in the recipient number in each chronic condition category
2. Total and per capita spending changes within various categories of service
3. Changes in service utilization

The results of the study were published in the journal *Pediatrics* in 2014.[6] 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% versus 14.5%)
- 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.

Solventum CRGs helped CHA researchers group patient data into accurate clinical categories so they could stratify costs by severity level and complexity of care. Insights gleaned from using Solventum CRGs can help payers and providers develop strategies for care management, design networks and implement disease management programs.



Choose risk measurement tools wisely

Solventum CRGs include the following five characteristics:

1. Its clinical model is based on diagnoses, procedures, drug codes, functional and mental health status
2. Each patient is assigned to a single, mutually-exclusive category
3. Patient severity level is based on the interaction of all of a patient's chronic diseases
4. It can compare types and amounts of services within the same category (i.e., clinically similar individuals)
5. Solventum CRGs accurately represent pediatric populations

On one level, you can say that Solventum CRGs quantify what many clinicians already know — that their sickest patients require the most resources. However, Solventum CRGs quantify this data in such a way that care managers and providers can use the information to develop effective interventions, and administrators can target and reduce the costs that threaten their systems.

In the end, Solventum 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 healthcare[7]

When it comes to understanding patient populations, organizations often don't know what they don't know. The same is true of risk adjustment. Solventum CRGs are here to help you understand your patient populations so you are better prepared to meet their healthcare needs going forward.

Footnotes

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