

THE JOHNS HOPKINS
ACG[®] SYSTEM
WHITE PAPER



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▶ INTRODUCTION

THE JOHNS HOPKINS ACG® SYSTEM is a leading risk measurement methodology that was developed and continues to be tested and improved at the Bloomberg School of Public Health. Johns Hopkins remains extremely committed to the ongoing development of the ACG System as it supports its overall mission to promote equitable, effective, and efficient health care around the globe.

For over 30 years, public health officials, hospital administrators and health care providers throughout the world have used the ACG System for a variety of applications ranging from care delivery, clinical case management, evaluative research, finance, and administration.

The system consists of a comprehensive suite of tools to improve quality of care, better predict resource utilization, and to reduce costs and improve efficiency in the health care sector. The ACG System converts patient data from a variety of sources – diagnosis codes, pharmacy codes, and laboratory codes - into actionable information.

This white paper will describe the key applications and unique benefits of the ACG System.

PERFECT STORM: CHALLENGES FACING THE INDUSTRY

The challenges facing the U.S. health care industry are formidable. The situation is already convoluted and several prominent health organizations anticipate the situation is likely to worsen in the coming years. In fact, several factors are expected to come together to create a “perfect storm” within the industry.

Soaring Costs

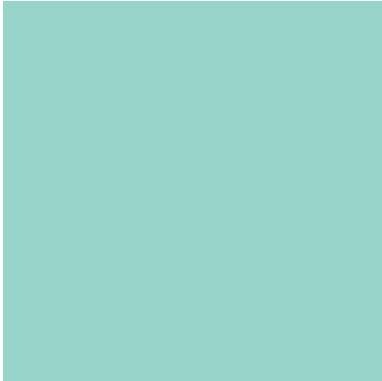
The Centers for Medicare and Medicaid Services estimates that total health care spending in the U.S. will reach \$4.8 trillion by 2021, nearly doubling the \$2.6 trillion spent in 2010. The main drivers behind this trend are rising hospital and provider costs, as well as advances in medical technology and pharmaceutical drugs.

Aging Population and Growing Morbidity Burden

Perhaps the most significant factor on the horizon is the aging U.S. population. The first baby boomers reached age 65 in 2011 and seniors are expected to comprise nearly one-fifth of the population by 2050. The CDC projects that longer life spans and aging baby boomers will combine to double the population of Americans aged 65 years or older during the next 25 years to about 72 million. By 2030, older adults will account for roughly 20% of the U.S. population.

As our population ages and the prevalence of chronic conditions spirals, so does the need to accurately track the impacts of multimorbidity burdens on a community or patient population. The growing burden of chronic diseases among the population adds significantly to escalating health care costs. Researchers at the Milken Institute project a 42% jump in chronic disease cases by 2023. Many chronic conditions can be managed through lifestyle choices, medications and other preventive measures. However, problems arise when patients with one or multiple chronic conditions fail to adhere to medical treatment and medications.





Case-By-Case: Challenges at the Local Level

Regardless of the widespread industry challenges, medicine is practiced and dispensed at the local level, which often renders big-picture solutions impractical. For the most part, health care officials and administrators must determine how to improve care within their communities on a case-by-case basis. A solution that can combine a bird's-eye view of the population with a patient-level view of behaviors and conditions is critical for practitioners, health care officials, and administrators to:

- Target patients who are at high-risk for hospitalization, high pharmacy use, or other costly services for early preventive care
- Track chronic care patients prone to medication errors, to better gauge clinical performance, cost of care and outcomes
- Predict the prevalence of disease within subgroups
- Assess the demand for services (by population subgroup) in order to allocate appropriate resources. Measure and contrast performance of clinics/practitioners based on the case mix of their patient population

THE ROLE OF THE ACG SYSTEM

The ACG System is built to handle the complexities of health care information flows, coding standards, and various systems. It can source data from individual patients' primary and secondary care records and make it available for use in a wide range of applications that are relevant to practitioners, administrators, health insurance plans and public-sector agencies. The ACG System's hallmark is its unique "person-focused" approach which was developed to capture the multidimensional nature of an individual's health at a given point in time.

The ACG System is the only population-based methodology that is fully adaptable to a local context, impacting close to 200 million lives in nearly 30 countries. It includes functionality for easy translation and can incorporate local cost structures, coding systems and local markers including socio-economic, functional status, living arrangement, or other dimensions relevant to the local health care setting.

The ACG System has clinical and administrative applications, which fall into four broad categories:



Population Profiling

- Measure the morbidity distribution of a population or subgroup
- Track disease prevalence in the population or among subgroups
- Forecast health care utilization for the population by cost and type of service
- Provide data points that help channel resources to meet demand
- Support service optimization and patient engagement



Patient Case Management

- Offer input for care management and disease management for the individual patient
- Identify patients at high risk for hospitalization, readmission and high pharmacy use
- Identify care coordination issues
- Identify patients for preventive care, wellness and education services
- Identify medication adherence issues
- Identify gaps in care to target for improved quality of care and patient outcomes



Finance/Budgeting

- Identify waste, inefficiencies and redundancies contributing to high operational costs
- Evaluate bottom-line costs
- Establish equitable payment rates based on population case mix
- Predict prospective cost risk at the population and individual patient level



Performance Analysis

- Set fair performance benchmarks among providers
- Compare and contrast groups of providers, employers or health insurance plans to evaluate morbidity risk and cost risk
- Calculate care density ratio to measure the degree of physician patient sharing as a proxy for the number of referral relationships among providers



UNIQUE STRENGTHS OF THE ACG SYSTEM

The basic premise underlying the ACG System design is that clustering disease morbidity is a better predictor of resource use than tracking the presence of specific diseases or disease hierarchies. The multimorbidity framework presents statistically valid and clinically logical information that can then be used for a variety of applications. The ACG System offers several unique advantages in a range of applications in commercial and research settings, including:

- Patient-centric methodology
- Total population assessment
- Track morbidity, not activity
- Proven reliability
- Full spectrum of applications
- Flexible and customizable
- Continuous development at Johns Hopkins



Patient-Centric Methodology

The ACG System focuses on the overall health status of an individual patient and was developed to help describe the multi-dimensional nature of a patient's morbidity over time. This approach enables clinicians to closely track patients with chronic care needs, identifying those most at risk for hospitalization, emergency room visits, and expensive medication. It also serves to provide a comprehensive picture of the total patient population or subgroups therein.

Most other case mix systems measure population health through the lens of specific diseases or diagnostic classes - asthma, heart failure, diabetes - or; they measure specific procedures or episodes-of-care failures. This approach delivers a sum of diagnostic codes, but is inadequate for the demands and clinical complexity that characterizes the current health care landscape.



Total Population Assessment

Many case mix risk-adjustment methodologies track patients with specialized needs – such as those enrolled in Medicare or Medicaid – and were modified to suit the needs of a more general patient population.

The ACG System was developed for U.S. populations in commercial health insurance plans as well as state Medicaid populations (children, low-income families and disabled individuals) to closely mirror the general population. As a result, it can account for an entire population, from healthy patients with relatively minor medical needs, to the sickest 5% of the population, who consume roughly half of all health care resources.



Track Morbidity, Not Activity

The ACG System uses clinical diagnoses, pharmacy codes, and laboratory codes to categorize morbidity burdens. This differs from other risk adjustment methodologies that categorize patients by events such as hospital admissions, visits, specific procedures or episodes. Tracking overall health status offers a more accurate measure for several reasons. Clinicians with intensive practice styles may group patients into “sicker” categories, which can distort the data. Episodic approaches also emphasize acute exacerbations or flare-ups, which potentially represent failures in care management.

The focus on morbidity minimizes the impact of idiosyncratic provider practice styles and may reduce incentives for clinicians to perform unnecessary procedures or hospitalize patients to increase their risk rating or secure higher levels of compensation.



Proven Reliability

The ACG System has been used in commercial and research settings longer and more extensively than any other case mix system in the world today.

Global applications of the ACG System have demonstrated its validity and robustness under all types of health care systems. The methodology yields statistically valid and diagnosis-based information based upon a well-defined set of clinical indicators that have been vetted in the health services research literature as demonstrated in our extensive, publicly available bibliography.

The ACG System is also more stable than predictive models that are based on machine learning techniques, which must fit a model to a specific set of data. Additionally, the System is more transparent and defensible than machine learning models.



Full Spectrum of Applications

The ACG System supports a wide range of applications from simple spreadsheet calculations to complex multivariate statistical models across a variety of health care applications. Predictive models are designed to be both concurrent and prospective.



Flexible and Customizable

The ACG System easily integrates with existing analytic software tools and maximizes use of available data. Users have the ability to customize aspects of the software and localize it to yield relevant information for clinical and purchasing activities.

The ACG System supports a wide range of diagnostic, pharmacy and lab code sets, including ICD9-CM, ICD10-CM, NDCs, ICD 9, ICD10, ATCs, ICPC Read codes and SNOMED CT.



Continuous Development at Johns Hopkins

Maintained by the Johns Hopkins Center for Population Health Information Technology (CPHIT), the ACG System receives regular improvements and modifications. Many of the faculty and staff have worked on the tool since its inception and remain committed to refining and developing typologies that make the most of available data.

Recent improvements include increasing the ACG System's predictive accuracy for identifying high-risk members and robust clinical categorization tools including improved hospitalization, medication adherence and stratification models. Areas of future research include lab markers and biometric data, social determinants of health and unstructured data from clinical records.

MORE INFORMATION

For case studies and webinars on global applications of the ACG System, academic research and many other resources, please visit the Johns Hopkins ACG System website at HopkinsACG.org.

For technical information, licensing options or other inquiries please contact the ACG System Team at info@HopkinsACG.org.