THE JOHNS HOPKINS
ACG® SYSTEM

FOR OVER 30 YEARS,

public health officials, health insurance administrators and health care providers throughout the world have used the ACG System for a variety of applications ranging from population health monitoring, clinical case management, performance evaluation and resource allocation.

Using diagnosis, pharmacy and lab data, our comprehensive suite of tools produces statistically valid, actionable information and insights that can help you improve quality of care, better predict resource utilization, and reduce costs and inefficiency.

The Johns Hopkins ACG® System is a leading population health analytics toolkit that was developed and continues to be validated and improved by experts at the Johns Hopkins Bloomberg School of Public Health to support its overall mission to promote equitable, effective, and efficient health care around the globe.

THE ACG SYSTEM AS AN ENTERPRISE SOLUTION

The ACG System is built to handle the complexities of health care information flows, disparate data sources and diverse coding standards. It uses data from individual patients' primary and secondary care records, which makes it suitable for use in a wide range of settings. Additionally, it can incorporate non-clinical data sources, such as socio-economic or functional living status to help you customize the data output in a meaningful and actionable way.

The ACG System has clinical, administrative and public health surveillance applications, which fall into four broad categories. The following list summarizes these categories and uses.

JOHNS HOPKINS
MEDICINE

THE ACG SYSTEM AS AN ENTERPRISE SOLUTION

Population Profiling

- Measure the morbidity distribution, disease prevalence and medication adherence of a patient population
- Identify population risk factors that may contribute to hospitalization, psychosocial conditions, frailty, high costs or care coordination risk
- Forecast health care utilization for the population by cost and type of hospitalization
- Stratify the population based on their patterns of disease and resource use

Patient Case Management

- Identify complex and multimorbid patients; patients who may need targeted care management programs and patients who need preventive care, wellness and education services
- Predict patients at risk for future hospitalization, readmission, high cost and high pharmacy use
- Identify patients at risk for opioid misuse, poor medication adherence and gaps in care
- Identify patients with newly diagnosed chronic conditions for proactive care

Performance Analysis

- Set equitable performance benchmarks among providers using case-mix and measures of cost and utilization
- Calculate care density ratio to measure the degree of physician patient sharing which can increase efficiency of care
- Use propensity score matching to compare two sub-groups of the population as part of an intervention program evaluation
- Evaluate appropriate use of the emergency department and proportion of visits that were avoidable to engage in patient care based on their needs

Finance, Budgeting, and Resource Allocation

- Estimate patients' predicted resource use by condition category
- Calculate equitable payment rates to providers or health plans based on population case-mix
- Anticipate staffing and rescource needs based on population risk factors and case-mix distribution
- Identify opportunities to reduce waste, inefficiencies, and redundancies contributing to high operational costs

CHALLENGES FOR THE FUTURE

The challenges facing the U.S. health care industry are formidable. The situation is convoluted and leading health organizations anticipate the situation is likely to worsen in the coming years to create a **"perfect storm"** within the industry, as highlighted below.

Soaring Costs

- U.S. health care spending expected to be $6 trillion by 2027; 1.5x more than 2018.
- **Driven by:**
  - Chronic conditions (esp. heart disease, stroke, osteoarthritis, obesity, diabetes and mental health)
  - Rising cost of hospital and provider services
  - Prescription drugs
  - Increased personal health spending
  - Expected growth in enrollment for health insurance products (esp. Medicare)

Aging Population Living Longer

- 1 in 5 Americans (80 million) will be over age 65 by 2040, compared to 1 in 8 in 2000
- More than doubling of 85+ population from 6.5 million in 2017 to 14.4 million in 2040
- Older Americans predicted to live on average two and a half years longer in 2040 than they did in 2000
- 83.4 million people will have 3+ chronic conditions in the U.S. by 2030, a 270% increase compared to 2015

Health Disparities

- People of color will account for over 50% of the U.S. population by 2050 and are disproportionately affected by health inequities
- Hispanics more than twice as likely to be uninsured than Whites
- The richest 20% of households have an average income nearly 17x greater than the bottom 20%
- **Health disparities account for $90 billion in excess medical care costs**
- Impact the economy through
  - lost productivity
  - economic losses due to premature deaths
  - reduced ability to participate in education and the working economy

Health care spending expected to be **$6 trillion** by 2027

CASE-BY-CASE: CHALLENGES ON 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:

- **Understand their population's current health needs and future risks** by quantifying the prevalence of disease and patterns of comorbidities within subgroups

- **Engage patients in early preventive care** by targeting those who are at high-risk for hospitalization, frailty, high pharmacy use or avoidable emergency department use

- **Track patients with chronic conditions over time** and monitor their medication cost and utilization patterns to better gauge clinical performance, cost of care and outcomes

- **Assess the demand for services** and allocate appropriate financial and staff resources, by evaluating population risk factors

- **Measure and contrast performance** of clinics and practitioners based on the case-mix of their patient population

UNIQUE STRENGTHS OF THE ACG SYSTEM

The core premise underlying the ACG System approach is that the clustering of disease is a better predictor of resource use than presence of one single disease or health care event. The multimorbidity framework presents statistically valid and clinically logical information that can then be used for a variety of applications, outlined above. The ACG System offers several unique advantages, which include:

Patient-centric methodology focused on morbidity

Holistic patient and population analyses across inpatient and outpatient settings

Proven reliability and transparent methodology

Full range of population, patient and administrative applications

Flexible and customizable

Continuous development by experts at Johns Hopkins

UNIQUE STRENGTHS OF THE ACG SYSTEM

Patient-Centric Methodology

The ACG System focuses on the overall health status of an individual patient and describes the multi-dimensional nature of a patient's morbidity over time. This approach enables users to closely track patients with chronic care needs, identifying those most at risk for hospitalization, emergency room visits, high cost and multiple medications. It also serves to provide a comprehensive picture of the total patient population or subgroups therein, using pre-defined or customized risk factors. This approach allows users to look beyond specific diseases, diagnostic classes or events such as hospital admissions, visits, procedures or episodes and instead track overall health status, aligning a patient-centered approach with clinical complexities to create a holistic patient view.

Holistic Patient and Population Analysis

The ACG System was originally developed for U.S. populations in commercial health insurance plans, state Medicaid programs and Medicare populations to closely mirror the general population's demographics. Further, it was designed to take a comprehensive view of a patient's use of health care resources across health care settings over a 12 month period, looking beyond a specific setting to a more general patient population. As a result, the analytic output is applicable to 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. Today, the ACG System methodology has been validated in nearly 30 countries globally through testing, long-term use and local adaptations to customers' needs.

Proven Reliability and Transparent Methodology

The ACG System is the longest and most extensively used population health analytics system in the world today and has been used in a large variety of settings, including commercial, government, research, and more.

Its globally validated methodology yields statistically valid information based upon a well-defined set of clinical indicators that have been vetted at Johns Hopkins and published in the health services research literature as demonstrated in our extensive and publicly available bibliography.

The ACG System provides enhanced stability from predictive models that are based on machine learning techniques, which must fit a model to a specific set of data. The current predictive models that exist within the ACG System are desirable for predicting future impact, but also robust and thoroughly tested.

UNIQUE STRENGTHS OF THE ACG SYSTEM
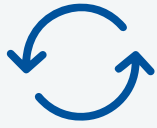
Continuous Development at Johns Hopkins

The ongoing development of the ACG System and the methodology undergoes regular improvements and updates in response to user needs and market demands, led by the Johns Hopkins Center for Population Health Information Technology (CPHIT). Many on the team have been involved with the ACG System since its inception, working with founder Dr. Barbara Starfield, and are experts in their field.

The most recent release includes new features such as new data inputs for lab results and supplementary medical data that can act as a disease registry function; an opioid risk marker; an expansion of the NYU Emergency Department algorithm and updates to the disease and medication risk markers. Regular mapping updates ensure new diagnosis, pharmacy, lab and procedure codes are mapped to the typologies in the software and minimize any data processing errors.

Future updates and improvements will seek to leverage additional data input sources, including additional lab markers, social determinants of health and unstructured data from clinical records as well as new methodologies for population segmentation and identifying patients at risk of an adverse medical event.
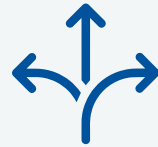
Flexible and Customizable

The ACG System easily integrates with existing analytic software tools and maximizes use of available data. Customers have the ability to customize aspects of the software and localize it to yield relevant information for clinical and purchasing activities. Additionally, if customers have access to other data sources such as biometric data, socio-economic data, geographic data or health plan eligibility data, these can all be incorporated into the analysis as pass-through variables, allowing the system to constantly adapt to new data availability and desired segmenting options.

More Information

For additional information including case studies, global applications of the ACG System, bibliography and customer training resources, visit **www.HopkinsACG.org**.

To speak to a member of the team about acquiring the ACG System, contact: **info@HopkinsACG.org.**

Now also available on **Microsoft Azure.**