

Using EHR Data for Risk Stratification Analysis: 7 Practical Applications

E-Guide

Developed in Collaboration
with SS&C Health



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Executive Overview

Electronic health records (EHRs) contain information not usually stored in other digital systems. This vital personalized information from all clinicians involved in a patient's care contains details that are crucial for medical reconciliation. However, what is missing with EHR data is access to information stored within pharmacy or medical claims, which is a common source of analysis for population risk stratification. The challenge for health systems, and especially primary care providers (PCPs), is how to maximize use of their accessible patient data for broader analytic insights into risk for their member population.

This whitepaper provides a framework to use EHR data to provide risk analysis and glean insight for improved care. We will explore commonly occurring challenges within a health system or provider organization and present corresponding use cases to solve those challenges, drawing on results from a Johns Hopkins School of Public Health study as validation.

Data Analytics Provide Risk Stratification Insight

Since EHR incentives began more than a decade ago, provider organizations have been looking for better technology to use this data to manage their populations. Both health plans and providers use risk scores to identify the needs and priorities for case management and care coordination. However, the information available to these organizations is not the same. Health plans have medical and pharmacy claims data to use as the basis for their analysis, while providers do not. What health systems do have is a wealth of structured and unstructured data available in their own EHRs. How useful is that data? We need to understand whether analysis of EHR data alone (without additional claims data) can yield valid results and how organizations can use that analysis in a practical and actionable way.

Being less reliant on claims and determining risk scores from EHR data will be more efficient for many providers.

Further, using EHR-derived data is a valid starting point that will yield meaningful results for some risk-stratification measures. For example, measures based on diagnosis alone, or lab data from the health system laboratories, as well as general pharmacy measures — such as active ingredient count available through

WHAT DOES THE RESEARCH SAY?



Results of a study¹ from Hadi Kharrazi, MD, PhD, and colleagues from the Department of Health Policy and Management at Johns Hopkins School of Public Health help answer this question.

The analysis for the study was performed using the **Johns Hopkins ACG® System**, a population-based casemix system that provides risk measures at the patient level, which can then be rolled up to group or population. In the study, EHR data was used to replicate the approaches commonly applied with administrative claims. The research results demonstrated that using common variables readily available from the EHR — diagnosis, medications prescribed and demographics — can give valid results for risk stratification using the Johns Hopkins ACG System.

medication reconciliation procedures — would produce accurate results. However, there are other measures such as pharmacy adherence or those based on the full patient experience (such as total costs or care coordination), where using EHR data alone would not be an accurate indicator, given the limited data of a health system's medical record. Given these parameters, what would be the most valuable analysis for care managers or care teams when only EHR data is available?

Practical Applications Using EHR Data to Overcome Common Challenges

Differences in patient morbidity influence numerous key performance indicators. In order to ensure efficient and equitable use of resources, it is necessary to adjust business processes based on patient risk levels. We propose seven use cases that highlight opportunities for the analysis of EHR data to manage differential risk within a primary care practice.



1. <https://www.hopkinsacg.org/document/prediction-accuracy-with-electronic-medical-records-versus-administrative-claims/>

Use Case I: Plan Staffing Needs²

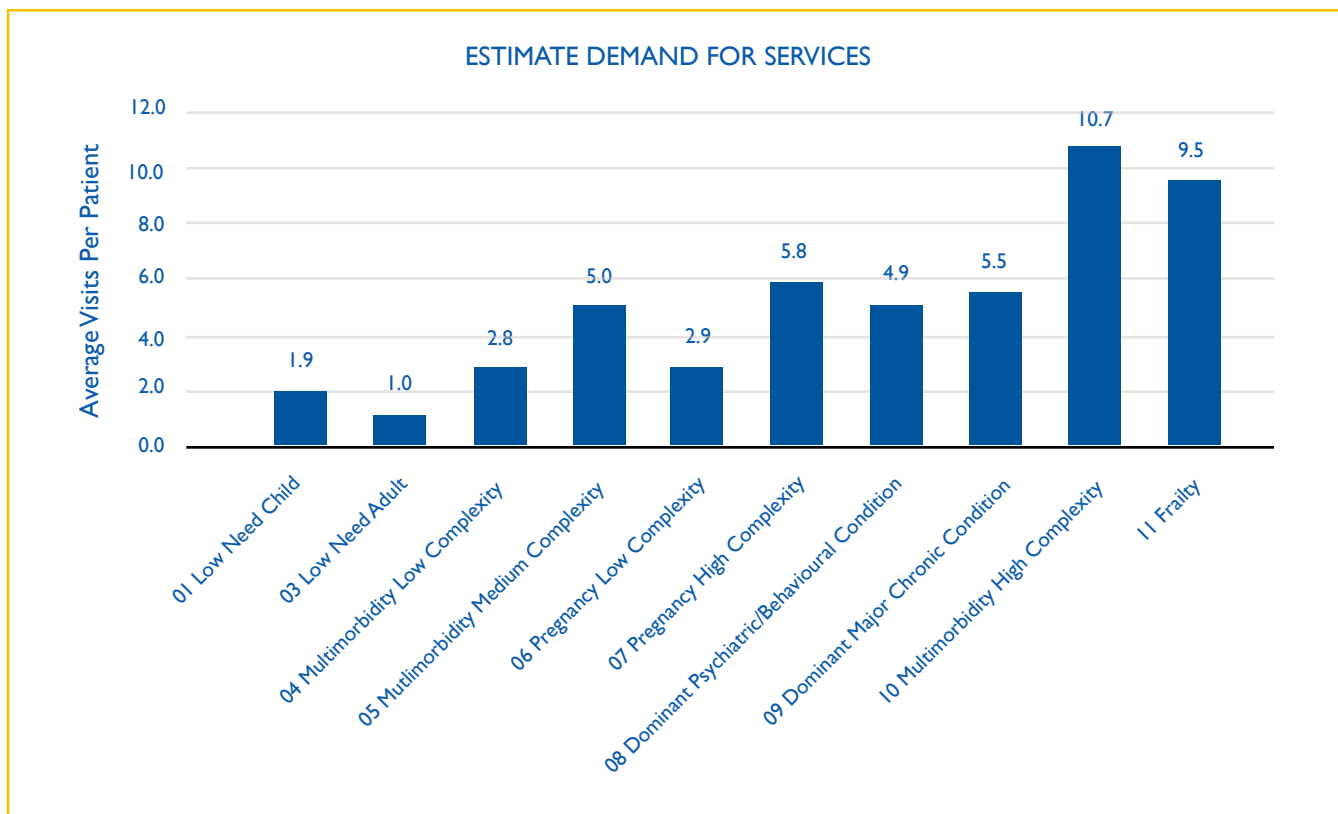
Health care organizations often track metrics related to physician productivity. Metrics such as the number of encounters, maximum panel size or the number of attributed members are directly affected by the health status of the patients.

For a busy primary care practice to ensure staffing needs are met, it is imperative to have insight into the distribution of patient needs. Both the frequency and intensity of visits are expected to increase with comorbidity, thereby enabling practices to estimate the total demand for services more precisely by measuring comorbidity among registered patients. Patient comorbidity may also influence appointment scheduling in terms of both which resources may perform the appointment and the expected duration of appointments.

Use the ACG System to risk-adjust patient panels or schedules for staffing productivity

After adjusting for health status, the ideal panel size may vary by physician and specialty. Visibility into patient needs enables practices to identify when a panel has no capacity and should be closed to new patients and distribute clinically challenging cases more equitably.

With this insight into patient needs, each employee can also be given the opportunity to use the fullest extent of their education and training, or “top of license”. Further, the practice can also uncover the need for certain types of services, such as behavioral health or social work, to determine if onboarding a resource directly into the practice is warranted.



2. <https://edhub.ama-assn.org/steps-forward/module/2702760>
<https://www.aafp.org/fpm/2019/1100/p23.html>
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5086026/>
<https://www.hsrdrresearch.va.gov/publications/esp/panel-size-primary-care.pdf>
https://www.ucop.edu/uc-health/_files/uch-chqi-white-paper-panel-size.pdf
https://na.eventscloud.com/file_uploads/c6cd21723145e0673c814b372a380132_DaleEricGreen-Cornerstone.pdf
https://cepc.ucsf.edu/sites/cepc.ucsf.edu/files/Toolkit%20_Empanelment%2018-0829.pdf
https://www.aafp.org/dam/AAFP/documents/about_us/initiatives/calculator/fmah19-cpcp-background.pdf

Use Case 2: Manage Health Needs Proactively³

Primary care practices play a critical role in delivering patient-centered care. Effective patient management requires attention to acute conditions identified during problem-focused encounters, balanced with management of chronic care needs. For example, it may be necessary to prioritize the chronic problems that can be addressed within the time limits of the encounter.

Use the ACG System to prioritize patients and ensure they are receiving the appropriate clinical care

Assessing comorbidity risk is also useful to establish the cadence of routine follow-up for chronic condition management.

Use Case 3: Reduce Total Cost of Care

Most health organizations operate with lean resources, which means the total cost for providing the best patient care is always a concern. Many have implemented or joined incentive payment programs designed to reduce the cost of care while improving outcomes. This is especially true regarding hospitalizations, which are large resource-use events where risk-driven prevention programs could have an impact.

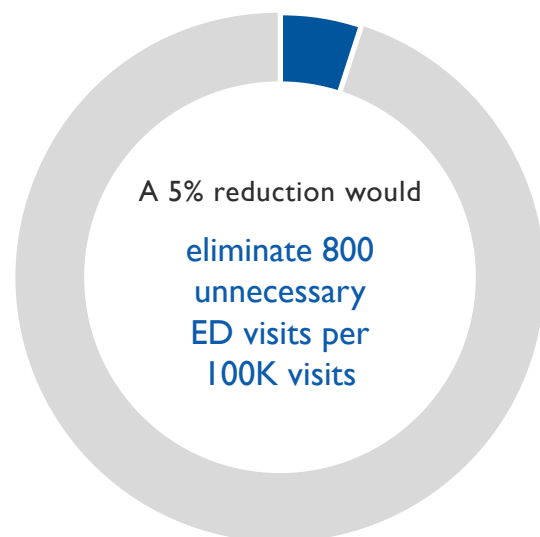
Use the ACG System to manage patient groups at risk for hospitalization or readmission

To calculate probabilities of hospitalization or readmission risk scores, the ACG System uses previous hospitalization information, patient age, sex, conditions, medications and other predictors, including various utilization markers. This analysis identifies at-risk patients, providing insight for resource focus on this group where risk can be mitigated, or the organization can prepare for potential hospital admission.

Along with reducing total cost, this use case also impacts the Merit-Based Incentive Payment System (MIPS). MIPS⁴ is one of two tracks under the Quality Payment Program, which moves Medicare Part B providers to a performance-based payment system.

Under this system, providers can get incentive payments for reducing total costs of care, not necessarily just their own delivered care. Since inpatient care is resource intensive, reducing inpatient stays and days can help achieve MIPS cost measure performance benchmarks by reducing total patient costs.

REDUCING THE NUMBER OF PREVENTABLE ED VISITS COULD RESULT IN SIGNIFICANT COST SAVINGS



At an average cost of \$1,055 per visit, the cost savings would be

-\$1M per 100k visits



3. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4058767/>
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1496560/>
<https://catalyst.nejm.org/doi/full/10.1056/CAT.17.0559>
<https://hbr.org/2017/11/how-to-reduce-primary-care-doctorsworkloads-while-improving-care>
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5550929/>

4. <https://www.cms.gov/files/document/2022-mips-summary-cost-measures.pdf>

Use Case 4: Improve Patient Care

Patients may have needs beyond the clinical services rendered in the office. Population health metrics can identify populations with high needs associated with frailty, disability or social needs⁵, enabling health systems to match those needs with all available resources, including those within the community.

Use the ACG System for needs-based assistance or eligibility for social programs

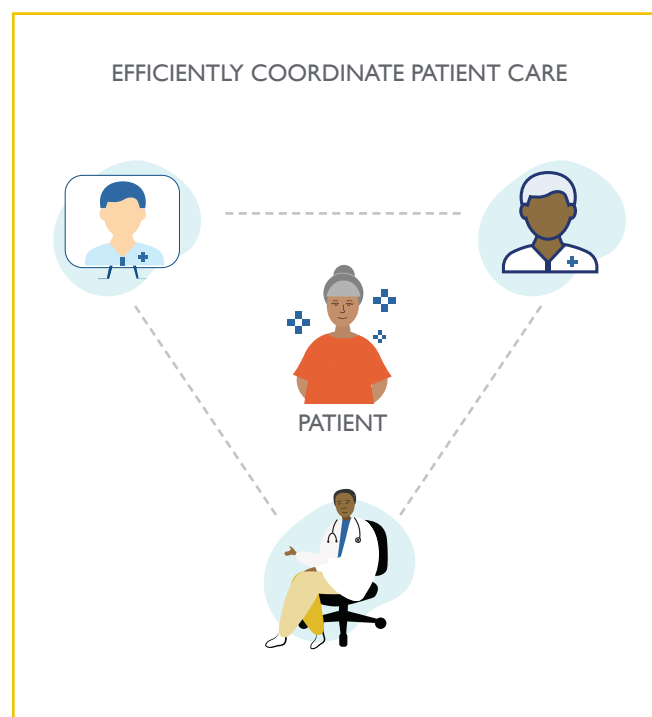
For example, a finding of frailty due to unexplained weight loss could indicate inability to prepare food or food insecurity. Armed with this information, the health system could target intervention by referring Meals on Wheels or a community social program if food insecurity is suspected. These types of referrals not only drive better health, but also reinforce the trusted relationship between patient and providers.

Use Case 5: Coordinate Care

The ability to group conditions based on common signs, symptoms, disease or illness can assist with patients that have complex health care needs. For example, patients with multiple chronic conditions and those with complex physical and behavioral health issues are likely to be seeking care from multiple specialists and require additional attention to ensure coordinated care. Prioritizing these patients in the morning huddle or rounds ensures that the care team is aligned, can anticipate patient needs and efficiently address the assessment, treatment and follow-up of the patient.

Use the ACG System to make sure patients have adequate and timely treatment with the right mix of providers

Care managers can continue to guide the care of more morbid or complex patients that could have more than one care provider. In this way, they can coordinate resources both inside and outside of health system encounters.



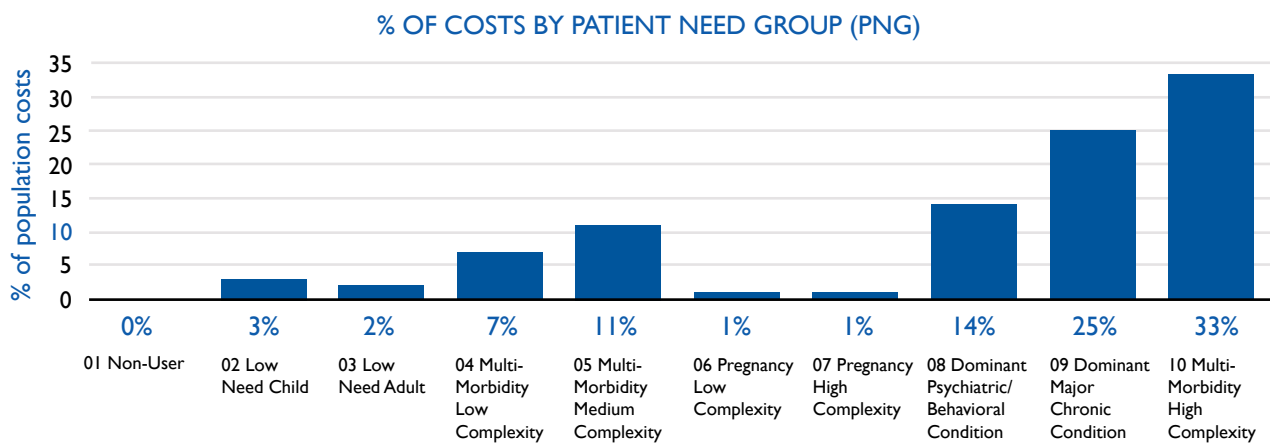
Use Case 6: Segment Patient Populations

Segmentation analysis uses available data to divide a patient population into distinct groups, which can then be targeted with care models and intervention programs tailored to each group’s specific needs. Fortunately there is a new capability within the ACG System which is used to segment populations into [Patient Needs Groups \(PNGs\)](#). PNGs provide a comprehensive view of health needs for individuals within their populations. In addition, segmentation can present a care manager with opportunities based on specific factors, and

allows for the tailoring of clinical programs for the segments based on health drivers (behavior, clinical, demographic). This visibility can help promote equitable care.

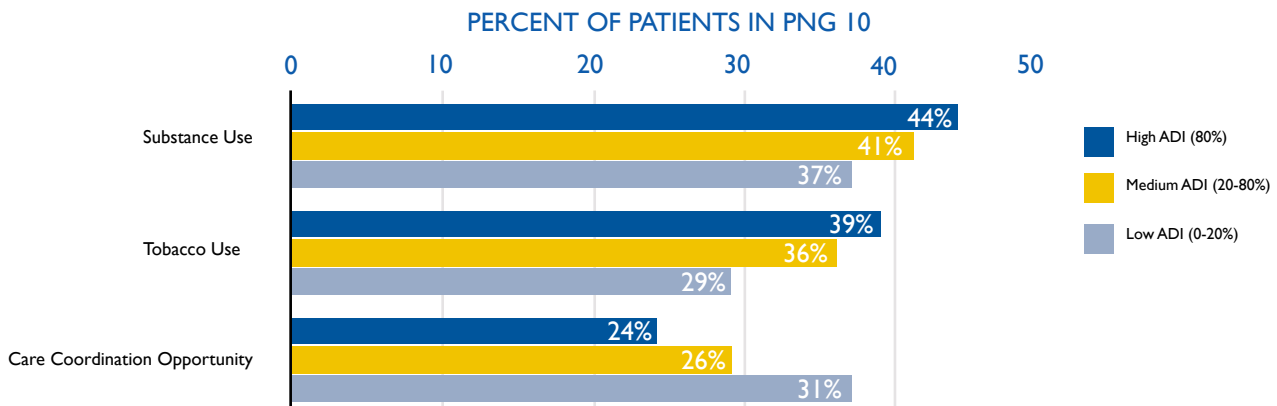
Use the ACG System to analyze health needs and promote health equity

The Patient Need Groups (PNGs) provide a simple segmentation to categorize patients that have similar levels of comorbidity. Summarizing each PNG with the total spend in the category can assist with prioritization for program development, monitoring and evaluation.



Further, the population can be segmented by Area Deprivation Index (ADI). ADI is a composite metric that measures income, education, employment and housing quality to differentiate disadvantaged neighborhoods.

Higher ADI is associated with increased deprivation. In this example, we can see that patients from disadvantaged neighborhoods are more likely to have substance use or tobacco use disorder, while people from more affluent communities are more likely to seek care from multiple providers and experience care coordination issues.



Use Case 7: Generate Revenue⁶

An organization can find opportunities for revenue generation using measures such as chronic condition counts or predictive scores to get patients into appropriate chronic care programs. The Johns Hopkins ACG System can identify candidates with multiple chronic conditions or high morbidity to recommend programs that would help them deal with their complex morbidity status.

Use the ACG System to find opportunities for revenue generation

ENHANCE REVENUE OPPORTUNITIES BY IDENTIFYING CARE COORDINATION FOR PATIENTS WITH MULTIPLE CHRONIC CONDITIONS

No. of Chronic Conditions	% of Patients	Average Cost PPPY (\$)	Average no. of Days in Hospital PPPY	Rate of ED Visits PPPY (Population Mean of One)	Average Risk of Hospitalization
0	48.9%	1454	0.00	0.5	1%
1	18.1%	4566	0.05	0.8	3%
2	11.4%	8268	0.16	1.1	4%
3	7.4%	11704	0.35	1.1	6%
4-7	11.6%	21955	1.12	2.4	10%
8	2.7%	53147	7.44	5.6	25%

Conclusion

Health care systems may not realize the value of the data elements they have available in the EHR and assume that administrative claims are required to perform meaningful risk stratification. However, analysis of EHR data alone can enable visibility into patient risk for a specified population and may become useful in negotiating future payment arrangements in support of value-based care.

The immediate availability of EHR data means there is no need to wait for claims to process to identify at-risk populations. As a result, data can be analyzed earlier, allowing care providers to be more proactive in targeting interventions, which can be especially important when dealing with higher risk populations such as multimorbid, frail and geriatric.⁷

Health systems can use this data analysis to address the care needs of patient populations who would be higher resource users or who may have morbidity issues where the provider community could assist with care.

This care referral could even be outside the health system, using community resources or co-engagement with ancillary services, such as long-term care facilities, or inpatient and outpatient services that can align to manage patient populations.

As proven through the [research study](#) by Dr. Kharrazi⁸ and illustrated by these practical use cases, analytics with EHR data alone — diagnosis, medications prescribed and demographics — can give valid results for risk stratification using the Johns Hopkins ACG System.

Analysis of EHR data using the ACG System provides not only valid risk stratification but also practical insights into better member health. As provider organizations use their EHR data results to understand and address patient risk, they will gain confidence in data validity using this method.

6. <https://www.cms.gov/outreach-and-education/medicare-learning-network-mln/mlnproducts/downloads/chroniccaremanagement.pdf>

7. <https://www.hopkinsacg.org/article/johns-hopkins-researchers-validate-using-senior-risk-factors-to-predict-utilization/>

8. Kharrazi H, Chi W, Chang HY, et al. Comparing Population-based Risk-stratification Model Performance Using Demographic, Diagnosis, and Medication Data Extracted From Outpatient Electronic Health Records Versus Administrative Claims. *Med Care*. 2017;55(8):789-796.



SS&C Health is a distributor of the ACG System that partners with health insurance plans to create solutions that power their vision and enable their success. For nearly 40 years, SS&C has utilized their deep expertise, technology and services to enable clients to efficiently operationalize and effectively scale their care strategies and re-imagine and deliver better health services.

ABOUT THE JOHNS HOPKINS ACG SYSTEM:

The ACG System is a flexible, transparent set of tools developed and validated by scientists and clinicians at the Johns Hopkins Bloomberg School of Public Health. The ACG System is used by Medicare, Medicaid and commercial health plans in the U.S.; health care providers; and technology companies. Customers use the ACG System to segment their patient populations and to process their organization's existing medical,

pharmacy and lab data to generate clinical risk markers and predictive models at the population and patient level. The ACG System provides health care analytics teams with the insights they need to inform rapid decisions about patient care, resource planning and service design.



To learn more about the ACG System, or if you are a customer needing further guidance on using the ACG System for risk stratification, please contact acginfo@jh.edu

