Understanding Patient Segmentation and How it Adds Value to Your Population Health Strategy

A Q&A with Klaus Lemke, PhD, MS

Johns Hopkins Bloomberg School of Public Health, Center for Population Health IT

Population health analytics is a continually evolving field, and organizations need to adopt clinically-relevant, actionable tools to succeed. The Johns Hopkins ACG® System—one of the most widely used population health analytics toolkits in the world—has developed a state-of-the-art patient segmentation tool, Patient Need Groups (PNGs), to help system users understand and address health needs within their populations.

We sat down with Johns Hopkins Bloomberg School of Public Health's Klaus Lemke, biostatistician, and the technical co-developer of the ACG System's PNG feature, to ask him about patient segmentation and to explain how organizations can apply PNGs and care modifiers to improve outcomes within their populations.

Q WHY IS POPULATION SEGMENTATION IMPORTANT TO ACG SYSTEM USERS?

A Population segmentation groups individuals based on specific health needs, individual characteristics and/or behaviors. Dividing the population this way enhances clinical care delivery and population health interventions. Most importantly, it allows for the tailoring of clinical programs for the segments based on specific health drivers (behavior, clinical, demographic) rather than based on a single score that is predictive of future cost or resource use. A segmentation-driven approach facilitates improved delivery of health services and allows for more nuanced tracking of outcomes.

> **Segmentation is:**
>
> **Person-Centric** – an individual is assigned only one category based on their most prominent health need
> **Hierarchical** – categories range from healthiest individuals to those with highest clinical need

Q CAN YOU DESCRIBE THE ACG SYSTEM'S APPROACH TO POPULATION HEALTH SEGMENTATION?

A Our approach to predictive modeling is centered on the whole person. We know that an individual's health needs are diverse and change across his or her lifetime. Our approach is aligned with the core premise of the ACG System: that the clustering of disease, or "multimorbidity," is a better predictor of resource use than the presence of one single disease or health care event.

Q HOW DOES THE PNG APPROACH DIFFER FROM OTHER METHODS?

A Two previous models are Bridges to Health and the National Academy of Medicine (NAM) taxonomy for high-need patients. Both of these are high-quality segmentation tools supported by research evidence.

Within the ACG System, we approach segmentation across the age spectrum based on health needs, financial risk and care opportunities. Our new segmentation feature — Patient Need Groups — expands the segmentation approach to the typical course of chronic diseases and gives focus to populations beyond the elderly and disabled. For example, our ACG System customers commonly focus on high-risk pregnancies and patients with newly diagnosed or worsening chronic diseases. Using the markers within the ACG System, we have created a segmentation model that includes the best from other models, while increasing focus on non-elderly and lower-risk populations.

Q SO, WHAT ARE PATIENT NEED GROUPS?

A PNGs categorize a population into eleven mutually exclusive segments according to patients' health-related needs. Health needs are suggestive of the type and intensity of services that patients require to address their patterns of disease. PNG segmentation applies to patients of all ages and with any pattern of disease.

The Patient Need Groups

PNG01	PNG02	PNG03	PNG04	PNG05	PNG06	PNG07	PNG08	PNG09	PNG10	PNG011
Non User	Low Need Child	Low Need Adult	Multi-Morbidity Low Complexity	Multi-Morbidity Medium Complexity	Pregnancy Low Complexity	Pregnancy High Complexity	Dominant Psychiatric Condition	Dominant Major Chronic Condition	Multi-Morbidity High Complexity	Frailty

Increasing Health Needs

In addition, the PNG framework adds two components to the core 11 segments:

- Flexible risk strata based on ACG predictive model scores, to identify high-risk patients within each PNG

- Care Modifiers, which indicate opportunities for clinical intervention and other special health care needs

The PNG segmentation framework is fully integrated in the ACG System and interrelates with other system components in population health analytics.
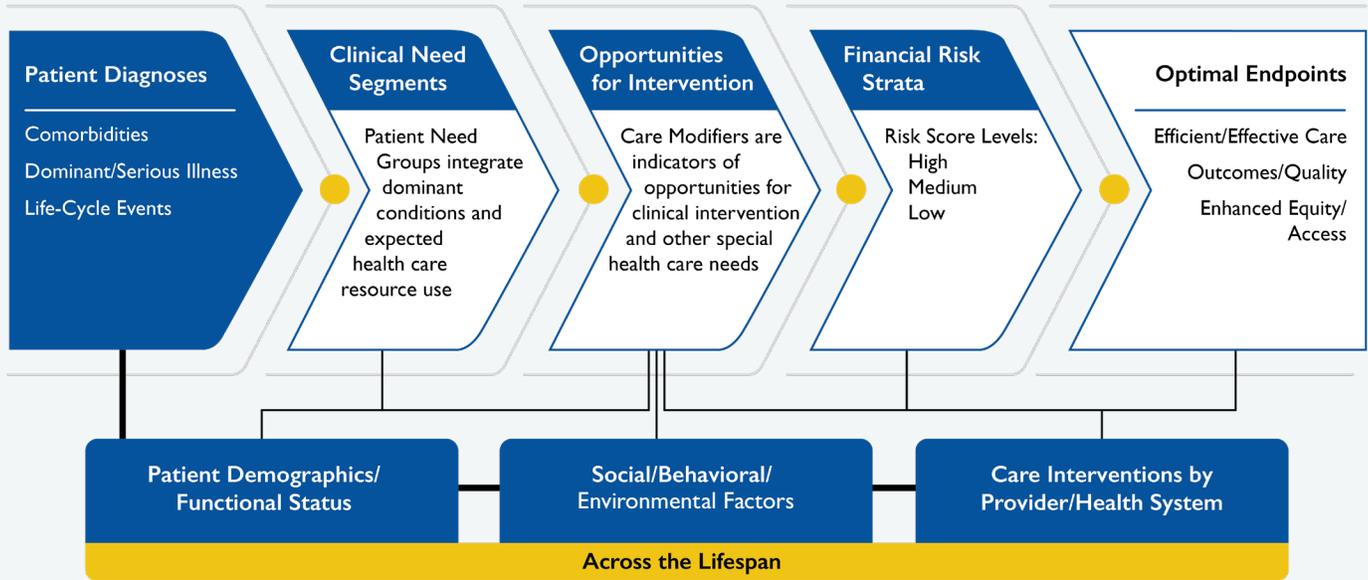
Q

HOW DO PNGs INTERACT WITH OTHER COMPONENTS OF POPULATION ANALYTICS?

A

PNGs integrate clinical and financial information into a framework for population health analytics. So, instead of looking only at patient demographics or individual risk markers, PNGs allow us to also examine clinical need and financial risk factors at the same time. These richer insights can help facilitate more efficient care or targeted clinical support.

Take a look at the figure below, which depicts how the PNG framework interacts with multiple factors to impact and explain health outcomes.

Patient Diagnoses

Comorbidities
Dominant/Serious Illness
Life-Cycle Events

Clinical Need Segments

Patient Need Groups integrate dominant conditions and expected health care resource use

Opportunities for Intervention

Care Modifiers are indicators of opportunities for clinical intervention and other special health care needs

Financial Risk Strata

Risk Score Levels:
High
Medium
Low

Optimal Endpoints

Efficient/Effective Care
Outcomes/Quality
Enhanced Equity/Access

Patient Demographics/ Functional Status

Social/Behavioral/ Environmental Factors

Care Interventions by Provider/Health System

Across the Lifespan

Q

HOW DO PNGs BUILD ON THE ACG SYSTEM'S EXISTING MODELS?

A

PNGs take the ACG System's models one step further by utilizing individual risk assessments. The table below describes key differences between traditional risk models and the PNG segmentation.

	Patient Need Groups	Individual Risk Scores
Clinical Domain	Health needs are suggestive of the types and intensity of services that individuals require to address their patterns of morbidity and health risk	Individual morbidity factors are the basis for person-level risk scores
Financial Domain	Future resource needs vary by group	Higher risk scores suggest greater future need for health care resources
ACG System Tools	PNG groupings are based on health needs and existing ACG System disease groupings	ACG predictive model scores are based on individual demographics, health conditions, prescribed medications and prior cost

Q WHERE DO YOU SEE PNGs ADDING VALUE TO HEALTH CARE ORGANIZATIONS?

A PNGs strengthen primary care and population health management activities in a variety of ways. With the assistance of PNGs, health care organizations may design effective service models based on their population's unique health needs. For example, frail adults likely need different services and assistance than individuals with less-complex disease. Likewise, an organization often has distinct protocols for complex pregnancies.

PNGs enable a wide range of analyses, including high-level population heath profiling, drilling down into population groups with defined characteristics and identifying patients for complex care management. In addition, segmentation can present a care manager with opportunities based on specific factors such as behavioral health conditions. Care Modifiers in the PNG framework, along with financial risk, identify populations for interventions targeting potentially preventable spending and improved health outcomes.

Ultimately, PNGs allow ACG System users to rapidly understand the health needs, patient types and opportunities within their populations, to focus resources and take targeted action.

Dr. Lemke is a senior member of the ACG System R&D team at the Center for Population Health IT (CPHIT) in the Department of Health Policy and Management at the Johns Hopkins Bloomberg School of Public Health. He actively contributes to the process of moving new tools for health care administration from software specification to testing and validation. He has also been a frequent presenter at ACG user conferences and has co-authored multiple academic papers that have featured ACG System components.

acg
JOHNS HOPKINS

ABOUT THE ACG® SYSTEM

The Johns Hopkins ACG System is the world's leading population health analytics software. The system continues to evolve, providing ever-more refined tools used in the US and across the globe for over 30 years, from commercial health plans and governments to health systems and large employers. The beauty of the ACG System is its ability to combine data from an array of sources to reveal powerful insights that go beyond just medical records.

By identifying risk and tracking patients over time, the ACG System can help you plan ahead and reduce health care costs—especially valuable to risk-bearing health systems and provider organizations. Most importantly, the ACG System allows you to be proactive rather than reactive when it comes to your population's unique health care needs. The system helps you combine a population-level perspective with patient-level behaviors and conditions. And because the system is incredibly flexible and responsive to new information, you can rest assured that no matter what comes next, the ACG System will continuously adapt to your health care management needs.

To learn more about PNGs and the ACG System, visit HopkinsACG.org, or email acginfo@jh.edu. If you are a current ACG System user, please contact your account manager.

JOHNS HOPKINS
M E D I C I N E