



Understanding Population Health Segmentation and Stratification through the use of Patient Need Groups (PNGs)

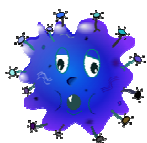
James Barrett
Alan Thompson
Steve Sutch



September 2022



↑ Ageing population



↑ Chronic Disease



↓ Less Money



Desire for Equity

To provide efficient care we need to understand the health profile of our population.

Access to big
data



Availability of powerful analytical tools to
summarise the data

This makes possible the creation of new models to help understand the health needs of the population.

Technique	Purpose
Segmentation	<ul style="list-style-type: none"> Segmentation is one of several analytical techniques that can be used to understand how disease and morbidity are distributed within a population The purpose is to group sub-segments of a population who share similar needs and will benefit from the same type of intervention or treatment The resulting segmentation analysis can inform the design of care management programmes that help achieve the triple aim of improved quality, better outcomes and lower cost
Stratification	<ul style="list-style-type: none"> Risk stratification differs from segmentation in that it identifies people at high risk of a certain event or high health care costs Put another way, risk stratification ranks a population based on degree of need, whereas segmentation groups people within that population based on what that need actually is

The Patient Need Groups methodology allows segmentation and stratification of the population, using available markers and predictive models from the Johns Hopkins Adjusted Clinical Groups (ACG®) System. There are three components:

Component 1: Patient Need Groups

Eleven (11) mutually exclusive population segments based on an individual's range of morbidities, conditions and care needs.

These segments are an extension of ACG's patient-centric methodology and the anchor of the PNG feature.

Component 2: Care Modifiers

An optional feature of the PNG tool, Care Modifiers are individual traits with opportunities for intervention. These offer actionable data points within each segment.

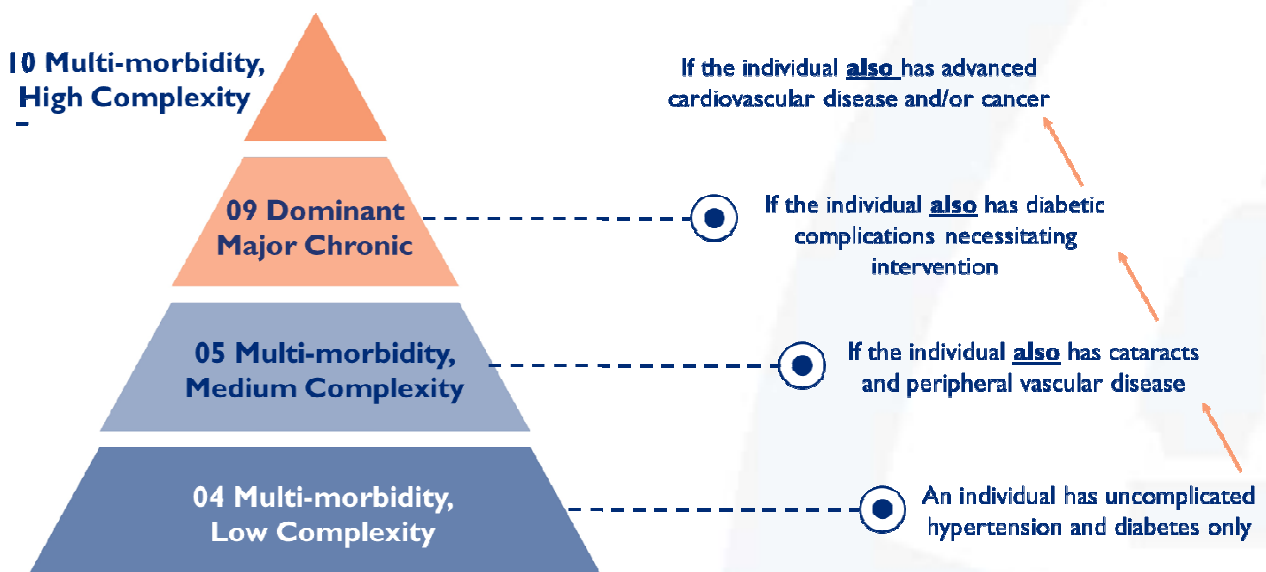
Component 3: Risk Stratification

An optional feature of the PNG tool, population segments can be stratified by predicted total cost risk level, allowing for nuanced understanding.

High ↑ Low	Frailty	11 Frailty	Adults aged 65 and older with evidence of <u>2 or more frailty concepts</u>
	High Complexity; Multi-Morbidity	10 Multi-Morbidity, High Complexity	Multi-morbidity with <u>high complexity</u> (major and unstable chronic conditions)
	Dominant Chronic	09 Dominant Major Chronic Condition	<u>Somatic condition with high impact on health</u> , without treatment the condition is progressive and unstable over time
		08 Dominant Psychiatric/Behavioral Condition	<u>Psychiatric condition with high impact on health</u> , without treatment the condition is progressive and unstable over time
	Pregnancy	07 Pregnancy, High Complexity	Pregnancy with or without delivery among women with high morbidity burden
		06 Pregnancy, Low Complexity	Pregnancy with or without delivery among women with low morbidity burden
	Moderate Needs	05 Multi-Morbidity, Medium Complexity	Multi-morbidity with <u>moderate complexity</u> conditions
		04 Multi-Morbidity, Low Complexity	Multi-morbidity with <u>low complexity</u> conditions
	Healthy	03 Low Need Adult	Adults aged 18 and older with acute morbidity and no more than one low complexity condition
		02 Low Need Child	Children aged 0 to 17 with <u>acute morbidity</u> and no more than one low complexity condition
		01 Non-User	Individuals who have <u>no diagnosis</u>

The “color coded” groupings of PNGs which can be nested together to form larger segments when appropriate

Individuals are categorized into higher PNGs segments based on the **severity of their condition and comorbidities.**



Care modifiers are a unique grouping of **actionable patient-specific factors** with known opportunity to improve care.

Modifiers can be mixed and matched to add additional granularity within PNG segments.

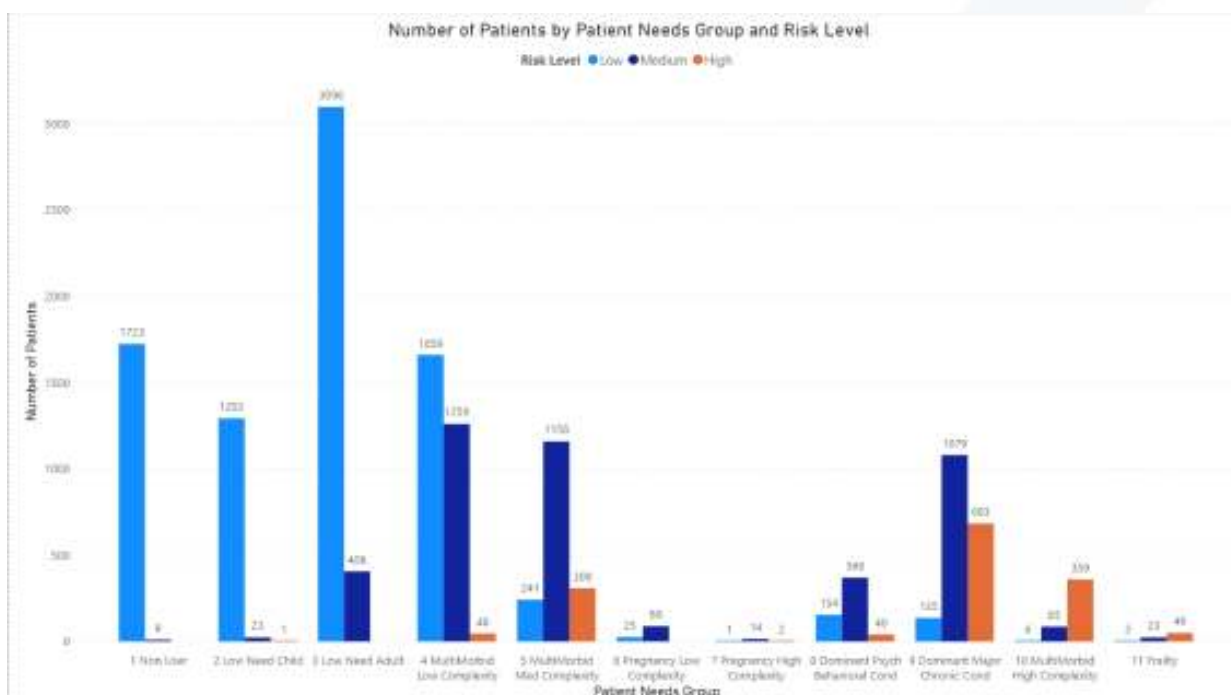
7

"Starter Set" of Care Modifiers		Description
Demographic	Age	Age groups 0-17, 18-44, 45-64, 65-79, 80+
	Sex	Female, Male, Other
Psychiatric / Behavioral	Non-Major Psychiatric Condition	One or more psychiatric or behavioral condition that is <u>not</u> included among the dominant psychiatric / behavioral conditions
	Major Psychiatric Condition	One or more psychiatric or behavioral condition that is included among the dominant psychiatric/ behavioral conditions
	Substance use	Substance use diagnosis or treatment
	Tobacco use	Tobacco use diagnosis or treatment
Special Medical Needs	Cardio-metabolic risk	Cardio-metabolic conditions including hyperlipidemia, hypertension, diabetes and obesity
	Polypharmacy, 5+ Rx types	Medications include 5 or more active ingredients
	Severe polypharmacy, 10+ Rx types	Medications include 10 or more active ingredients
	Cancer treatment	Cancer diagnosis with treatment
	End-stage renal disease	ESRD diagnosis
	Functional Impairment	Adult aged 18-64 years old with 2 or more frailty concepts
	Complicated newborn	Newborn status includes low birth weight, prematurity and disorders of newborn period
Coordination Needs	Care coordination opportunity	Likely coordination issue based on ACG ambulatory care coordination markers
	Lack of primary care	No generalist seen

8

Combines clinically-oriented health needs with predicted total cost, to identify high-need high-cost patients.

HIGH	MEDIUM	LOW
Predicted Total Cost Rank $\geq 90\%$	Predicted Total Cost Rank 60-90%	Predicted Total Cost Rank $< 60\%$



Population Profiling



- At a population or organisation level, gain an ‘at a glance’ understanding of different population groups and their associated costs (or utilization)

Supporting Design of Care Management Programs

PNG	% Population	Avg Cost
Frail	1-4%	\$75,800
Multi-Morbid, High Complexity	5%	\$38,200
High Complexity Pregnancy	1%	\$15,300
Low Complexity Pregnancy	2%	\$8,500
Medium Complexity	12%	\$3,300
Low Need Adult	26%	\$450

Most cost, utilization, and potentially preventable hospitalizations occur in the frail and multi-morbid groups. **Are they receiving prospective care-coordination services?**

Almost 30% of pregnancies have an underlying risk factor, placing them at high risk of maternal/newborn outcome. **How are they being supported in your pop health strategy?**

These individuals have meaningful underlying health needs but have not yet escalated to needing inpatient or ED services. **How can we prevent their disease worsening?**

Healthy now – best target for preventive screenings

Care modifiers reveal actionable patient-specific cost-savings opportunities

PNG 09: Dominant Major Chronic Disease



- 57% of patients have an impactable cardiometabolic risk factor
- 33% have severe polypharmacy
- 12% lack adequate primary care
- 9% have a care coordination opportunity

Annual Cost Savings Opportunities within PNG 09



An **innovative approach** to patient categorization from the Johns Hopkins ACG System

Component 1: Patient Need Groups

A core set of 11 population segments

Component 2: Care Modifiers

Individual traits with opportunities for clinical intervention

Component 3: Risk Stratification

Levels used for insightful overlay of predicted cost with current health needs



Thank You

**JOHNS HOPKINS**
MEDICINE