The Added Value of Using Primary Care Data in Population Health Management

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POPULATION HEALTH MANAGEMENT

- Population health management is a data-driven tool or methodology that refers to ways of bringing together health-related data to identify a specific population that health and care systems may then prioritise for particular services. One common approach to population health management is 'population segmentation'.

  – J Holmes, The King's Fund, 2022.

SEGMENTATION

Technique	Purpose
Segmentation	• 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

PATIENT NEED GROUPS (PNGs)

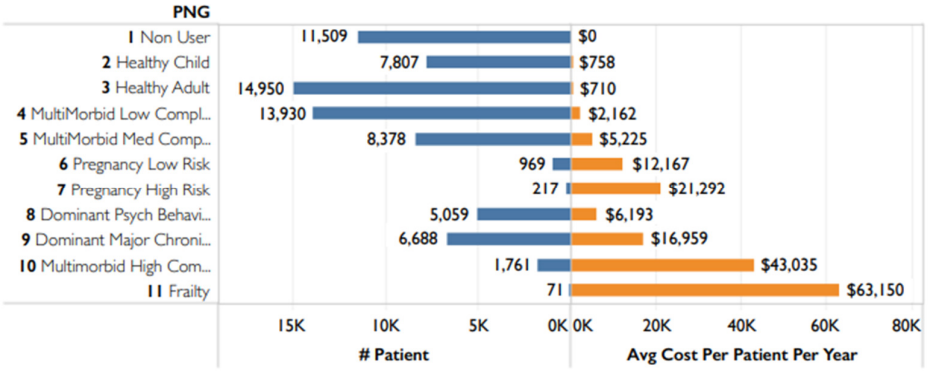
High

Low

Frailty	11 Frailty	*Adults aged 65 and older with evidence of 2 or more frailty concepts*
High Complexity; Multi-Morbidity	10 Multi-Morbidity, High Complexity	*Multi-morbidity with high complexity (major and unstable chronic conditions)*
Dominant Chronic	09 Dominant Major Chronic Condition	*Somatic condition with high impact on health, without treatment the condition is progressive and unstable over time*
	08 Dominant Psychiatric/Behavioral Condition	*Psychiatric condition with high impact on health, 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 moderate complexity conditions*
	04 Multi-Morbidity, Low Complexity	*Multi-morbidity with low complexity 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 acute morbidity and no more than one low complexity condition*
	01 Non-User	*Individuals who have no diagnosis*

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

Population Profiling



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

JOHNS HOPKINS MEDICINE POPULATION HEALTH ANALYTICS
WHAT CAN PNGs BE USED FOR?

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**

METHOD

- Question:

  Is it possible to segment the population using just hospital data?

- Method:

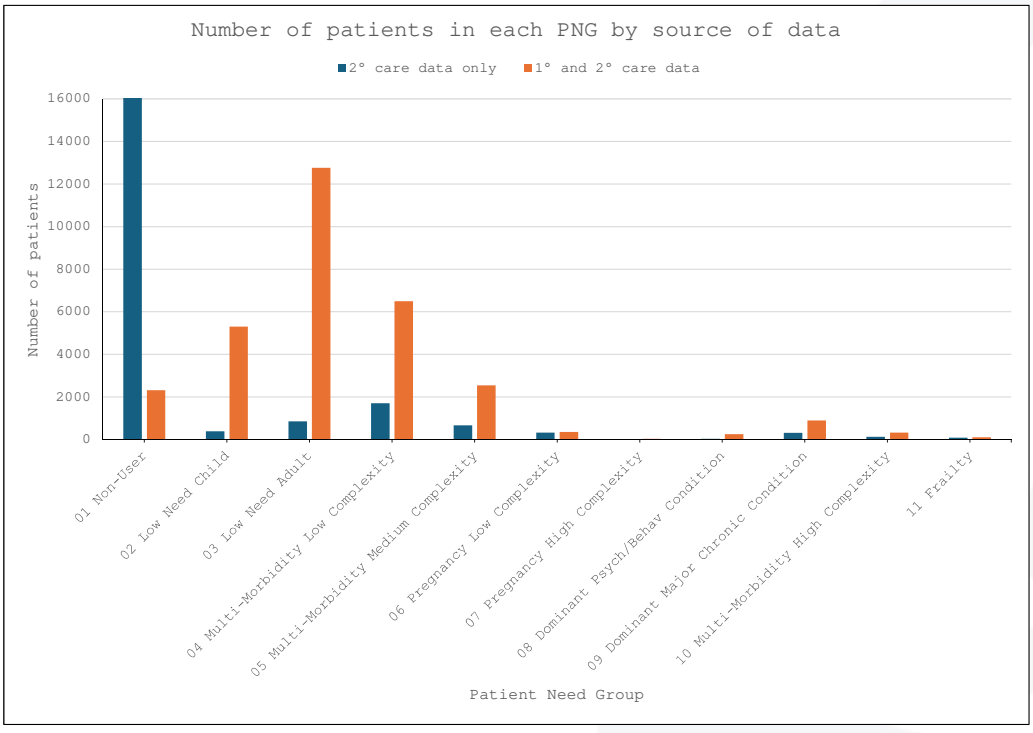
  Hospital in-patient data (2° care) and Primary care data (1° care) was obtained for a small population of about 30,000 patients. Three sets of data were processed by the ACG system:

  – 2° care data only
  – 1° care data only
  – 2° care data and 1° care data combined

- Output:

  The ACG system assigns each patient to a PNG and also produces prevalence figures for a range of common diseases.

PNG DISTRIBUTION



PNG DISTRIBUTION

		1° and 2° care data - revised PNG										
Patient Need Group	2° Care	01	02	03	04	05	06	07	08	09	10	11
01 Non-User	26921	2316	5019	12421	5094	1250	54	1	206	520	33	7
02 Low Need Child	394		292		73	22	1		5	1		
03 Low Need Adult	853			344	333	133	4		5	30	4	
04 Multi-Morbidity Low Complexity	1705				1001	606			8	46	39	2
05 Multi-Morbidity Medium Complexity	667					541			1	25	87	9
06 Pregnancy Low Complexity	333						303	25	2	3		
07 Pregnancy High Complexity	11							11				
08 Dominant Psychiatric/Behavioral Condition	37								34	1	2	
09 Dominant Major Chronic Condition	319									277	37	5
10 Multi-Morbidity High Complexity	134										130	4
11 Frailty	89											89
Total	31463											

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11 Frailty	89											89
Total	31463	2316	5314	12765	6505	2552	362	37	261	903	332	116

COMPARISON OF DISEASE PREVALENCE

		2° care		1° care	
EDC	Description	Patients	%	Patients	%
EAR11	Acute upper respiratory tract infection	99	0.31%	2458	7.81%
GUR08	Urinary tract infections	179	0.57%	1573	5.00%
INF02	Fungal infections	20	0.06%	428	1.36%
GSU04	Cholelithiasis, cholecystitis	80	0.25%	52	0.17%
GSU14	Gastrointestinal obstruction/perforation	231	0.73%	104	0.33%
GSU02	Appendicitis	35	0.11%	17	0.05%
CAR03	Ischaemic heart disease (excluding acute MI)	348	1.11%	752	2.39%
CAR14/15	Hypertension	1124	3.57%	3673	11.67%
END04	Hypothyroidism	147	0.47%	633	2.01%
END02	Osteoporosis	102	0.32%	354	1.13%
FRE03	Endometriosis	19	0.06%	91	0.29%
GAS06	Peptic ulcer disease	191	0.61%	392	1.25%
NUR06	Parkinson's disease	23	0.07%	76	0.24%
NUR24	Dementia	87	0.28%	206	0.65%
SKN02	Dermatitis and eczema	41	0.13%	986	3.13%

EXAMPLES OF REAL WORLD PHM

JOHNS HOPKINS ACG® SYSTEM

Case Study: Leicester, Leicestershire and Rutland Use the ACG System to Develop a New Funding Model for Primary Care in England

SUMMARY

This paper describes the work undertaken by Dr. David Shepherd and colleagues at Leicester, Leicestershire and Rutland (LLR) Integrated Care System (ICS) to create a new funding model for primary care that more closely aligns with population need. The new funding model was introduced in the summer of 2021 and since then, it has helped address many of the issues related to inequity in health outcomes that existed using the old funding formula. Three examples of these improvements are described below.

THE CHALLENGE

The funding formula for primary care family doctor services in England—the Carr-Hill formula[1]—has remained unchanged since 2004. Since its inception, it has been widely acknowledged that the Carr-Hill formula has certain limitations, particularly in relation to measuring workload in the form of patient need. The only reliable way of measuring patient need is to analyse patient-level data, something that was not available when the Carr-Hill formula was introduced.

However, patient-level data is now widely available in the form of electronic medical records and data sets that integrate data from both primary care and secondary care.

THE SOLUTION

LLR has a diverse population of over one million people, ranging from very deprived inner-city communities to more affluent populations in rural areas. The size of each primary care practice also varies considerably. For several years, LLR has had access to patient-level data for its whole population and has used this to design and manage its approach to population health. It also uses the Johns Hopkins ACG System to assist with activities such as population profiling, high-risk case identification and casemix-adjusted outcomes assessment. This patient-level data and the use of the ACG System is the basis for the creation of the new funding model.

The new funding model maintains a core element of funding that is linked to the basic level of support needed to run essential functions common to all practices, but unlike the old formula, it includes a significant element of funding based on the needs of the patients managed by each practice.

It was also recognised that – for the new funding model to be accepted and adopted by all primary care practices – the practices would need to be consulted and involved in its design. The ICS engaged in the widest consultation exercise it had ever undertaken, including all affected service providers. Any new funding model would be delivered with the understanding that no service provider would drop below its current level of funding under the existing Carr-Hill formula.

The main factors considered and adopted in the development of the new funding model in LLR included:

- The use of local data
- Making an adjustment for variation in data quality: as a result, poor data quality did not adversely impact on the amount of funding received
- A weighting based on casemix (need): the key element of the funding model that accounts for the overall level of need for the patients managed by each primary care practice
- Considering patient turnover on the basis that new patients generate more demand in the first year after registration
- Recognising communication issues: acknowledging that patients who do not speak English or have other communication barriers require additional support

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- Casemix adjusted funding formula for Primary Care (UK)
  - Leicester, Leicestershire and Rutland (LLR) Integrated Care Board have created a new funding formula for primary care where a significant component is based on the casemix of the population.
  - This is helping practices with a more complex caseload implement more services for their population.
  - Recent analysis of outcomes is showing this extra funding makes a real difference to care.
  - Further information here.

EXAMPLES OF REAL WORLD PHM

JOHNS HOPKINS ACG® SYSTEM

Kumar Medical Centre Uses Segmentation Methodology to Optimise Patient Outcomes

INTRODUCTION

A team of health care professionals at Kumar Medical Centre in Slough is using the new segmentation tool within the Johns Hopkins ACG® System to help ensure patients are seen at the right time, by the right health care professional for the right amount of time. Patient Need Groups' (PNGs) is a segmentation tool that categorises people by their overall level of complexity – taking into account all of the diseases and conditions they have. The PNGs are clinically relevant, mutually exclusive and hierarchical.

Frimley Integrated Care System (ICS) has developed a nationally leading population health intelligence capability that builds upon a mature shared care record programme called Connected Care, which is supported by Graphnet and incorporates the ACG System. Using Connected Care and PNGs, the team at the Kumar Medical Centre (KMC) were immediately able to segment people needing a Quality and Outcomes Framework (QOF) review based on their level of complexity. This has helped KMC to transform their approach to the annual QOF review process.

THE CHALLENGE

A key component of the QOF is to help improve outcomes for patients with certain conditions. GP practices are encouraged to maintain a register of patients with 19 conditions and ensure their care and medication is managed according to best practice. Typically, the process includes an annual review of the patient.

The team at KMC, led by Dr Priya Kumar, had up until recently carried out these reviews in a very traditional way — patients were invited for a review based on the month of their birth and the workload had been distributed amongst all qualified staff. All patients needing a review were treated the same, irrespective of whether they were complex and multimorbid patients — or relatively fit with just one of the QOF conditions.

Dr Kumar, who was familiar with PNGs from work in other parts of the Frimley Integrated Care System (ICS), saw an opportunity to redesign the QOF review process at the KMC. The redesigned process would be able to address some of the limitations and unintended consequences of their historical approach — such as some people having to be seen more than once as the health care professional they first saw wasn't able to change their prescription; or seeing people most at risk of complications based on their complexity prior to the winter, to optimise their care.

Dr Priya Kumar explains: 'By using a population health approach and identifying our most complex patients using the Johns Hopkins Patient Need Groups, we are able to review the patients according to complexity rather than date of birth and allocate the right health care professional the first time.'

Dr Kumar wanted to challenge the current way of working and organise QOF reviews differently by planning QOF appointments for more complex patients earlier in the year, while resources were more flexible, and before seasonal pressures kicked in.

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- Optimising Patient Outcomes using PNG segmentation (UK)
  - Kumar Medical Centre, part of the Frimley Integrated Care System, is using segmentation based on PNGs to schedule annual reviews for chronic conditions and assign appropriately experienced clinical staff for the level of complexity of the patient.
  - For example, the most complex patients are seen early in the financial year to optimise their health before autumn and winter and therefore reduce the risk of an emergency admission.
  - Further information here.

CONCLUSIONS

- The use of only 2° care only datasets to support Population Health Management activities has several limitations
- These limitations include:
  - Only 10-20% of patients visit hospital each year
  - Some significant diseases missed eg angina and many chronic conditions
  - Underlying multi-morbidity missed
- To support Population Health Management activities, the addition of data from 1° care data is required to:
  - Assess the needs of the majority of the population being studied
  - Obtain a full picture of the morbidity burden within that population
  - Capture the full morbidity profile of each patient.

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Thank You

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