



JOHNS HOPKINS
MEDICINE

POPULATION
HEALTH ANALYTICS

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

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Johns Hopkins Healthcare Solutions



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- 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.



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



High

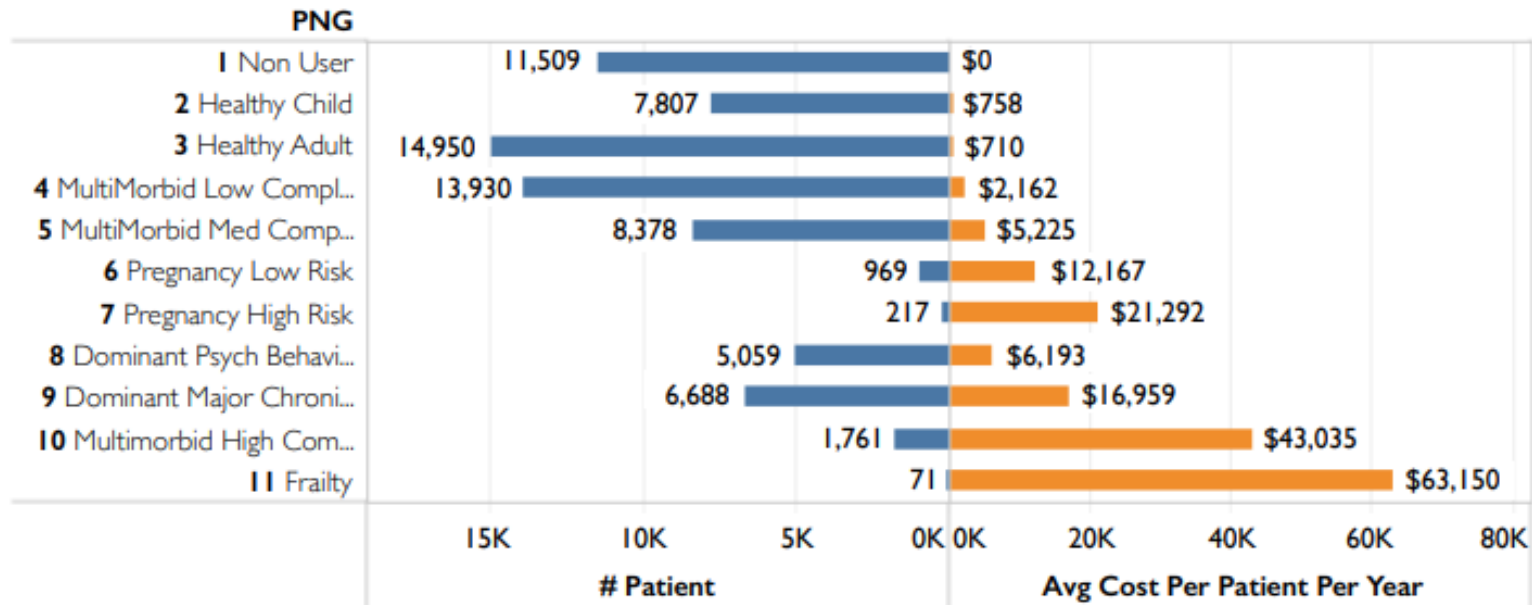


Low

High	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, without treatment the condition is progressive and unstable over time</u>
		08 Dominant Psychiatric/Behavioral Condition	<u>Psychiatric condition with high impact on health, without treatment the condition is progressive and unstable over time</u>
	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 conditions</u>
		04 Multi-Morbidity, Low Complexity	Multi-morbidity with <u>low complexity conditions</u>
	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>
Low			

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)

		%	Average Age	Average number of chronic diseases	Average number of visits to primary care	Average number of active ingredients (different drugs)	Unplanned hospitalization per 1,000	Average risk of emergency admission	
Healthy	1	Non-user	0.60%	23	0	0	0	0.00%	
	2	low need child	14.40%	9	0.2	2.4	0.6	37	0.00%
	3	Low need adult	30.20%	42	0.3	1.9	0.6	8	0.00%
Moderate needs	4	Multimorbidity , Low Complexity	23.60%	47	1.7	4.9	2	47	0.20%
	5	Multimorbidity, Medium Complexity	15.70%	62	4.2	9.4	4.6	132	7.90%
Pregnancy	6	Pregnancy, Low Complexity	0.80%	31	1	6.8	1.6	80	0.20%
	7	Pregnancy, High Complexity	0.20%	32	2.7	11.4	3.1	338	3.60%
Dominant chronic	8	Dominant psychiatric/behavioral condition	3.30%	46	3.6	7.8	3.5	114	5.40%
	9	Chronic condition	6.50%	58	4.4	9.6	5	146	16.40%
High complexity; Multimorbidity	10	Multimorbidity, High Complexity	3.50%	71	7.9	15.9	8.2	714	51.30%
	11	Frailty	1.20%	85	8.1	16.5	8.1	751	55.60%



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**



- Question:

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

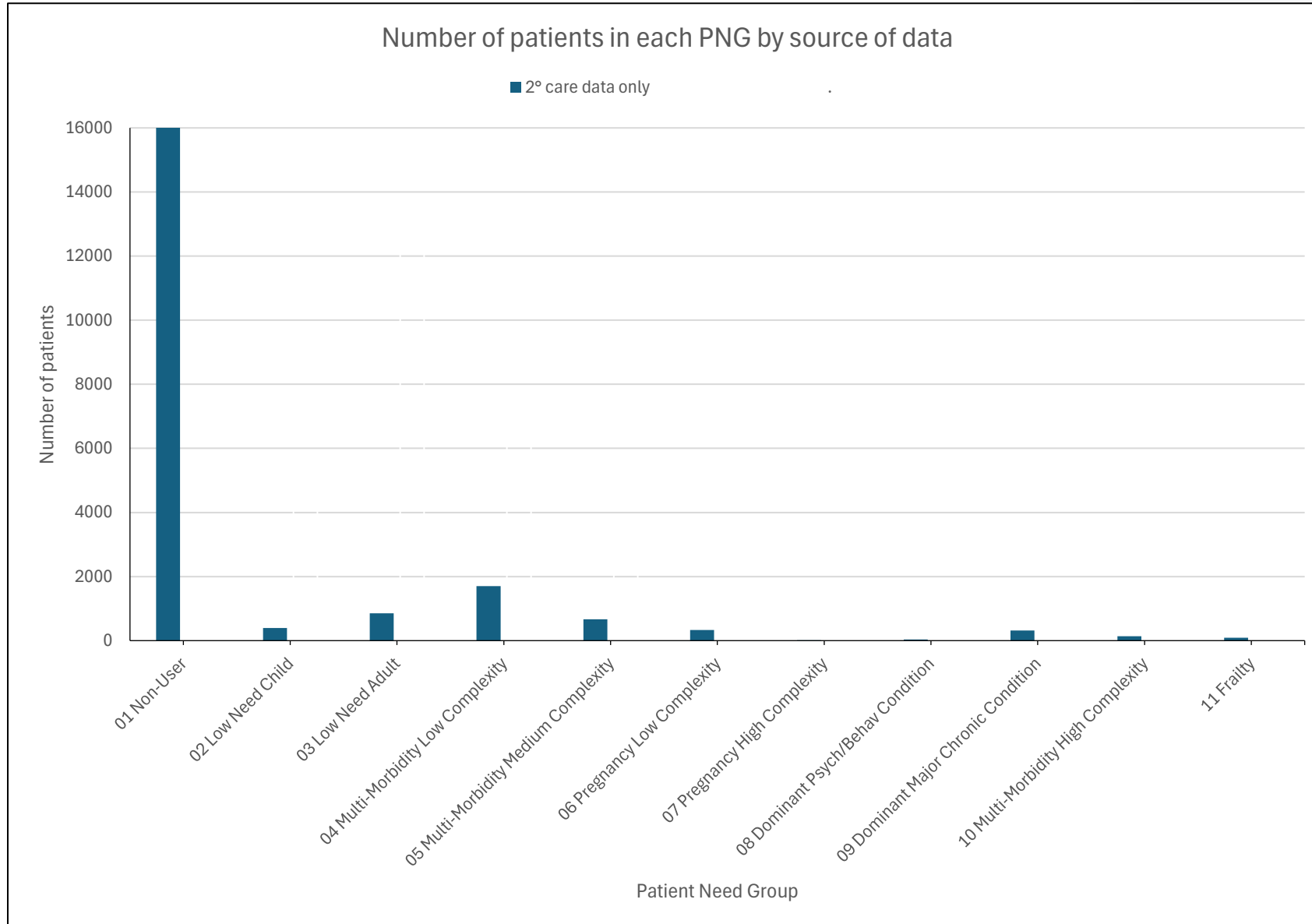
- Method:

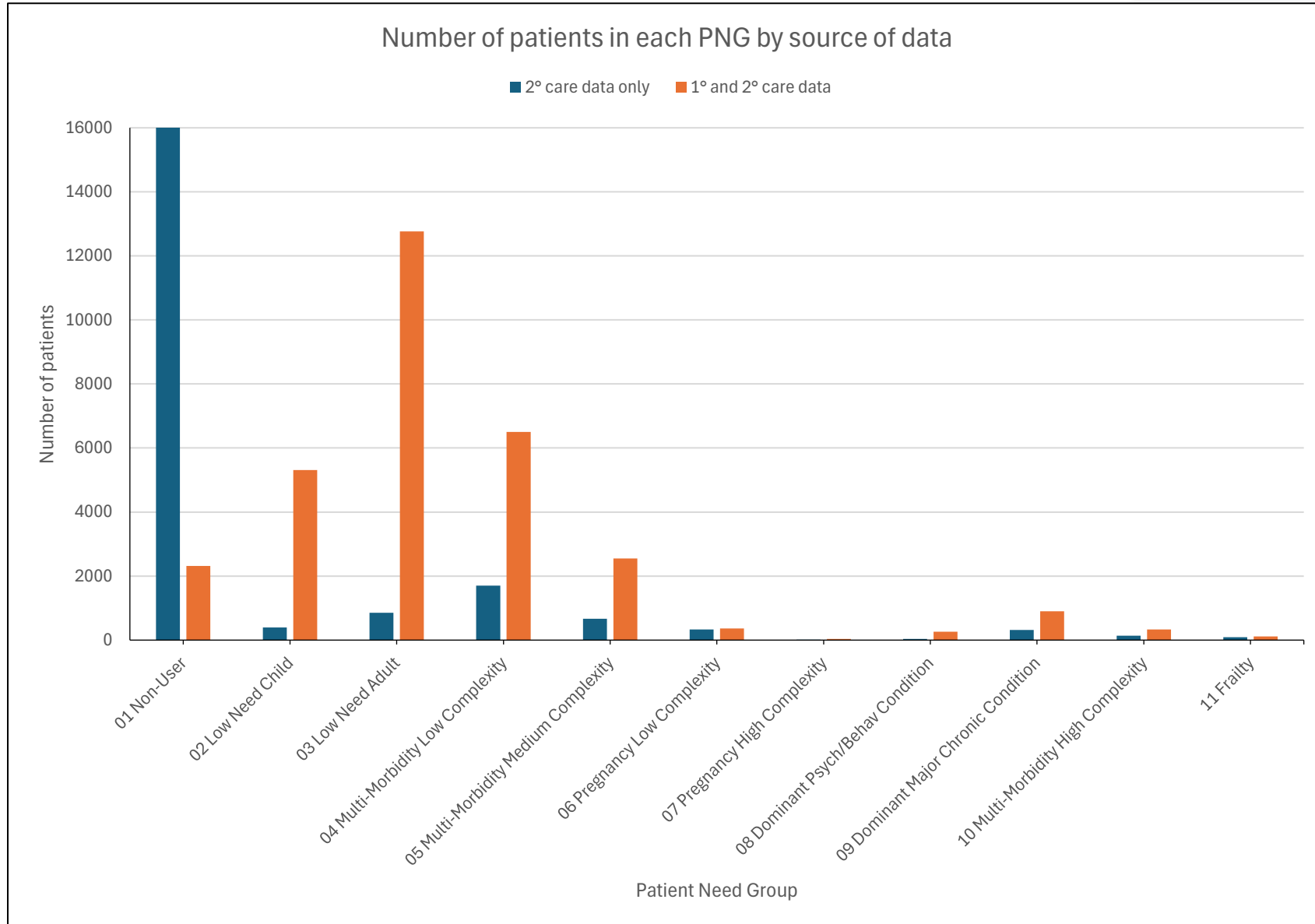
Hospital in-patient data (2° care) and Primary care data (1° care) was obtained for a small population of about 30,000 patients. Three sets of data were processed by the ACG system:

- 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.







Patient Need Group	2° Care
01 Non-User	26921
02 Low Need Child	394
03 Low Need Adult	853
04 Multi-Morbidity Low Complexity	1705
05 Multi-Morbidity Medium Complexity	667
06 Pregnancy Low Complexity	333
07 Pregnancy High Complexity	11
08 Dominant Psychiatric/Behavioral Condition	37
09 Dominant Major Chronic Condition	319
10 Multi-Morbidity High Complexity	134
11 Frailty	89
Total	31463

		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										
02 Low Need Child	394		292									
03 Low Need Adult	853			344								
04 Multi-Morbidity Low Complexity	1705				1001							
05 Multi-Morbidity Medium Complexity	667					541						
06 Pregnancy Low Complexity	333						303					
07 Pregnancy High Complexity	11							11				
08 Dominant Psychiatric/Behavioral Condition	37								34			
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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				
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EDC	Description	2° care		1° care	
		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%

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- **Parkinson's Disease** - 1 in 37 people alive today in the UK will be diagnosed with Parkinson's in their lifetime.
- **Multiple Sclerosis** - There are over 130,000 people with MS in the UK with 7,000 people being newly diagnosed each year.
- **Long-COVID** - In the UK, it is estimated that approximately 2 million people (3% of the population) experience long COVID
- **Endometriosis** - 1 in 10 women and those assigned female of birth of reproductive age in the UK suffer from endometriosis.
- **Thyroid disease** - The prevalence of an underactive thyroid is 2% in the UK
- **Low back pain** - Back pain is the largest single cause of disability in the UK, with lower back pain alone accounting for 11% of the total disability of the UK population.
- **Autism and ADHD** - Around 1% people are on the autism spectrum - around 700,000 autistic adults and children in the UK.
- **Irritable bowel syndrome** - at least 12% of the UK population is affected by IBS.



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 formula¹—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.

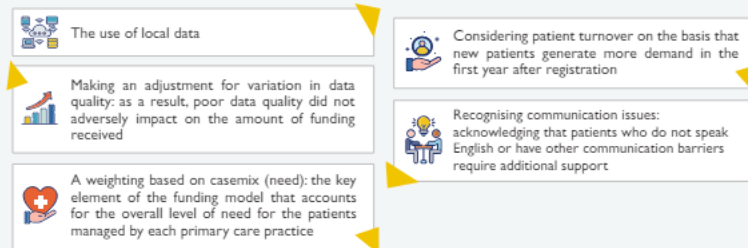
THE SOLUTION

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:



- **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](#).



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 Groups¹ (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.

- 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](#).



- The use of only 2^o 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^o 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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www.hopkinsacg.org/acg-uk-webinar-recordings/
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Ref	Day	Date	Time (UK)	Subject	Speakers	Link
1	Wednesday	2 October 2024	13.00 - 13.45	The Added Value of Using Primary Care Data in Population Health Management.	Dr James Barrett, Johns Hopkins HealthCare Solutions.	Register for 1st Webinar Here
2	Wednesday	16 October 2024	13.00 - 13.45	Social Needs Markers in the Electronic Health Care Record.	Paul Molyneux, Johns Hopkins HealthCare Solutions.	Register for 2nd Webinar Here
3	Wednesday	23 October 2024	13.00 - 13.45	Evaluating Outcomes of an Enhanced Diabetic Service.	Steve Sutch & Paul Molyneux from Johns Hopkins, Tim Jones from East Kent ICB.	Register for 3rd Webinar Here
4	Wednesday	6 November 2024	14.00 - 14.45	Creating Capacity in Primary Care – Redesigning how QOF reviews are managed using a segmentation-based approach.	Dr Priya Kumar, Kumar Medical Centre, Slough.	Register for 4th Webinar Here
5	Wednesday	20 November 2024	13.00 - 13.45	The Brookside Access and Continuity Model – How Brookside Group Practice in Berkshire has significantly improved patient access and care continuity.	Dr Amit Sharma, Strategy and Partnerships Lead, & Tash Poller, Digital Transformation Manager, Brookside Group Practice.	Register for 5th Webinar Here
6	Wednesday	4 December 2024	13.00 - 13.45	Elective Recovery - Streamlining the peri-operative pathway based on patient clinical need.	Ian Nicholson- Population Health Consultant at Graphnet & Dr Caroline Pritchard – Consultant Anaesthetist at NHS Buckinghamshire NHS Trust.	Register for 6th Webinar Here



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M E D I C I N E

Thank You

