Using Johns Hopkins Patient Need Groups to Understand and Support Urgent Care Demand

Being able to identify and analyse how different segments access urgent health care has informed our decision making around new service provision and design. It also allows us to monitor the impact of new services and to ensure that care provision is joined up and efficacious for particular groups, across both primary and secondary providers.

In the planned care space, information from segmentation has allowed us to identify people on waiting lists that require more or less pre-anaesthetic assessment, targeting both stretched clinical resource as well as facilitating stand-by lists of low complexity individuals that can help maximise elective operating throughput.

Dr John Seymour MA PhD FRCP
Consultant Respiratory Physician
Deputy Medical Director

Introduction

Frimley Health and Care Integrated Care Board (Frimley ICB) and Frimley Health Foundation Trust (FHFT) are using the Patient Need Groups (PNGs) segmentation tool within the Johns Hopkins ACG® System to better understand urgent and emergency care demand with great success.

Frimley ICS is a partnership of NHS, health services, local authorities, voluntary sector and local people. Frimley ICS has developed 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. The PNG feature assigns patients into one of eleven mutually exclusive segments based on their clinical need. This approach to segmentation is allowing users to understand where to quickly focus their population health strategy and giving a clinically orientated view of patients.

The Challenge

Rising urgent care demand and its impact on the main acute trust (FHFT) and primary care is a key strategic priority and one where Frimley's Connected Care team set out to support with a novel approach to develop insights that can support decision making. The team wanted to better understand local urgent and emergency care demand and to ensure that presenting patients received the best and most appropriate care in the right setting. By creating a simplified way of thinking about emergency care in Frimley, the team are supporting stakeholders with key decisions around organising the delivery of urgent care.

The team at Frimley identified that there was a vast amount of operational analysis being produced and shared across the system but it was difficult to establish clear messages, identify and agree collective priorities and that this complexity prevented action.

Alex Barnett, Associate Director of Analytics at Frimley ICB explains: *'In the knotty world of urgent and emergency care, it can be difficult to make sense of what is going on at any given time as there is a complex decision-making process and data landscape. We know that the Emergency Department (ED) is the most expensive and sometimes least appropriate place to go for many presenting patients, but that is still too often where they end up. It also often attracts significant resources to increase capacity when it is a demand side issue that needs addressing. Our goal as a team was to try and support the system with key decisions around how to deliver urgent care and to identify a manageable set of priorities to address demand that would have a meaningful impact on acute pressures.'*

The Solution

The team worked with clinical leads from both primary and secondary care to develop a common framework for understanding urgent care holistically. The framework uses PNGs and segmentation methodology to tackle the challenge in a novel and intuitive way.

Barnett explains: *'At its core, our concept was that the entirety of urgent and emergency care demand can be categorised based on two dimensions; firstly, by the underlying health of the individual, which we represented using the PNGs and secondly, by the acuity of their presenting need, which can range from minor illnesses and injuries through to the most urgent care events.'*

How does it work?

The framework outlined below illustrates the approach, where PNG segments are grouped into Green, Amber and Red (the rows) and the presenting need is grouped into Red (emergency), Amber (urgent) and Green (on the day) categories (the columns).

		On the day		Urgent			Emergency
		• Upset tummy • Pain or headache • Sore throat (but if for two or more weeks contact your GP)	• Minor aches & pains • burns or scalds • head lice etc • bites a& stings • queries about medication dosage, type or suitability plus urgent requests • medication related to hospital discharge • repeat prescriptions	• Get help for condition that has not improved after seeking help from pharmacy • to repost urgent conditions that are not life threatening • to report deterioration in urgent condition	• If you think you need to go to hospital • if you don't know the most suitable place to go or call • if you don't have a GP to call or your GP practice is closed • if you ned advice or reassurance about what to do	• Sprains & strains • suspected broken limbs • minor head injuries • cuts and grazes • minor scalds and burns • skin infections	• Loss of consciousness • an acute confused state • fits that are not stopping • chest pain • breathing difficulties • sever bleeding that cannot be stopped • severe allergic reactions • severe burns or scalds
Low need segment (71% of population)	1 Non user (2.4%)		e.g. Low need child with sore throat				
	2 Low Need Child (16.7%)			1		e.g. Low need child with suspected broken limb	
	3 Low Need Adult (33.2%)			2			
	4 Multi-Morbid Low Complexity (18.8%)						
Moderate need segment (19.7%)	5 Multi-Morbid Med Complexity (9.1%)				3		
	6 Pregancy Low Complexity (1.0%)						
	7 Pregancy High Complexity (0.2%)						
	8 Dom Psych Behavioral Cond (2.5%)						
	9 Dom Major Chronic Cond (6.9%)				4		
High need (2.8%)	10 Multi Morbid High Complexity (1.9%)						
	11 Frailty (0.4%)		e.g. Frail patient with minor aches and pains			e.g. Frail patient with suspected broken limb	
	Unknown (6.9%)						

This enabled the team to break down all urgent care activity and then map activity and volume to each of the segments and resulted in the group identifying four priority areas to focus on. Barnett continues: '*We tried to identify similar patients with similar types of presenting demand that we felt could be modified. The modification element was crucial to it — having quantified the amount of activity and volume in each of the segments, the next part of the exercise was to explore how the clinical model for each segment could be modified to reduce demand on the ED.*'

The team rapidly developed a report that combined ED activity information with PNG segments to allow the clinical group to explore demand within each of the priority segments. They found, for example, that minor illness from PNG segments 3 & 4 accounts for 102 attendances per day (15% of total). The top 5 reasons are Abdominal Pain, Chest Pain, Fever, Difficulty Breathing and Headache. With only a 12.8 % admission rate, clinicians felt this was a modifiable opportunity of meaningful size to have an impact on overall demand.

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Overview of Key Findings and Recommendation

Segment	Key Insights	Potentially Modifiable ED Opportunities	Outcomes & Objectives
Low need and low complexity adults	**54.4%** of population. ≈**70-80%** of ED attendances are without prior GP contact. Peak ED at 10-11am.	Minor illness acounts for **102** attendances per day (**15%** of total). Top 5 reasons are Abdominal Pain, Chest Pain, Fever, Difficulty Breathing and Headache. **12.8%** admission rate.	• Access to/update of community provision for minor illness
Low need children	**56.6%** of population. ≈**70-80%** of ED attendances are without prior GP contact. Peak ED at 6-9pm but only slightly above daytime average.	Minor illness acounts for **35** attendances per day (**5%** of total). Top 5 reasons are Fever, Abdominal Pain, Vomiting, Difficulty Breathing and Cough. **6.2%** admission rate.	• Behaviour change/improved advice/-self-care (using Healthier Together App). • Access to/update of community provision for minor illness.
Multimorbid medium complexity	**9.1%** of population. Peak ED at 6-9pm but only slightly above daytime average.	Illness acounts for **59** attendances per day (**9%** of total). **17** admissions per day and 8% of total non-elective bed days. Top reasons are Chest Pain, Abdominal Pain, Difficulty Breathing, Fever, Shortness of Breath and Fever.	• Prioritised improvement of CVD and respiratory condition management.
Dominant chronic condition	**6.9%** of population. Hypertension, Depression, Obesity, Diabetes and Cancer most common conditions.	Illness acounts for **44** attendances per day (**6%** of total). **14** admissions per day and 8% of total non-elective bed days. Top reasons are Chest Pain, Abdominal Pain, Difficulty Breathing, Fever and Shortness of Breath.	• Prioritised improvement of CVD and respiratory condition management. • Remote monitoring of highest risk patients within the cohort.

Key messages: The cohorts identified in this analysis account for 87.1% of the population and exclude our most frail, pregnant and SMI cohorts. The cohorts shown consume over 70% of urgent care activity across the system and 47.2% of non-elective bed days in total. The intervention areas identified target a subset of their ED activity deemed modifiable/avoidable to some extent. The subset of activity represents 240 ED attendances per day (=36% of attendances) and circa 20% of non-elective bed days.

> *We designed a clinical exercise where we tried to identify similar patients with similar types of need whose care could be modified, for example, a healthy child who presents at the ED with minor illness. This meant we ended up with some examples of high volumes of activity that did not need the services of the ED and started to think about a different type of care model.*
>
> *- Agi Zarzycka, Analytics Lead at Frimley ICS*

The team worked on the new care model to visualise what additional services in the community would look like — e.g., out of hours children's drop-in unit and on-the day access for people with a problem who are otherwise well. Zarzycka continues:

'Patients have unique health needs that are driven by their medical conditions and social factors, and PNGs were an important component here when tackling this issue.'

Outcome and Benefits

The work carried out has been successful on several levels and has meant that the options available to the urgent care team have changed quite drastically. The team are now able to demonstrate and explore whether attendance is appropriate or avoidable and, for example, where the volume of attendance per day is so low that designing and providing a new service is not cost effective.

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The fact that the new framework has simplified the urgent care planning process and is supporting clinical decision making is a massive benefit.

Dr Priya Kumar, a Primary Care lead in this work, reflects that *'Urgent care is a complex system to navigate. By embedding the ACG System segmentation tool into our systems, we are further supporting our clinicians with a greater understanding of the patient in front of them. Combining this with their clinical decision-making skills means our patients are being seen by the right health care professional first time, which creates time and space to care and improves the overall outcomes and experiences for our patients.'*

Frimley have also developed some powerful outcome measurement metrics — including whether the mix of attendances changes over time and the proportion of ED attendances that had prior contact with a primary care service. Barnett says:

'Having segments that clinicians would intuitively understand without having to go into detail has proved crucial to this work. This is intelligence-led decision making, because we have created a framework that is coherent and consistent, and that people can rapidly understand and use.

PNGs are now becoming a "clinical currency" that people are starting to use in their discussions. Those involved in the urgent care sector are starting to use this language (i.e., "green-green" or "amber-amber" or a "red-red") and we are starting to see adoption of that sort of shorthand. Clinical buy in and trust of the segmentation process has been crucial, which has led to a simplified way of thinking about urgent care.'

Summary

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Barnett continues:
The work has highlighted the fact that there are many attendances presenting at the ED that could be managed elsewhere. We feel that we have been able to simplify an overly complex space, which has resulted in better conversations across sectors, between primary and secondary care, because we are all looking at the same approach and having the same discussion. The project owes much of its success to the fact that it has been very clinically led in terms of identifying opportunities that we felt modifiable and putting the data right in front of the clinicians from the outset.

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. Customers use the ACG System to segment their patient populations and to process their organisation'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.

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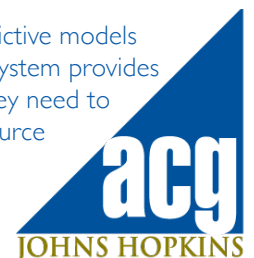
To learn more about the ACG System, please visit hopkinsacg.org or email acginfo@jh.edu

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