

INTRODUCTION TO THE  
IMPORTANCE OF  
DEMOGRAPHICS IN PATHOLOGY  
DEMAND OPTIMISATION

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The Benchmarking Partnership



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[www.thebenchmarkingpartnership.com](http://www.thebenchmarkingpartnership.com)

## **About The Benchmarking Partnership**

The Benchmarking Partnership were founded in 2015 as a collaboration between Keele University Benchmarking Service, Highbury Analytical, and Beeston Consulting, initially to explore the possibilities of providing pathology benchmarking and related programmes internationally. This led to a number of successful local and national programmes of work in Australia.

The Keele team are now operating within The Benchmarking Partnership to deliver the national UK laboratory benchmarking programme, a subscription-based service which gathers data from around 100 laboratories across the UK to cover areas such as quality and turnaround times, workload and complexity, staffing and skill mix, and cost efficiency, in addition to a range of pathology demand optimisation programmes.

The team also continue to contribute towards international research publications and other relevant pathology and healthcare diagnostics-related initiatives.

## **The Benchmarking Partnership Primary Care Demand Optimisation Programme**

The Benchmarking Partnership has been delivering pathology demand optimisation programmes since 2006, contributing towards a number of related publications in an on-going commitment to research. Over the years it has expanded to cover a number of different areas:

- Demographic and pathways analyses, identifying opportunities for secondary care bed day cost savings and improvements in patient outcomes, and using demographic data to create relevant peer groups for context and meaningful comparison.
- Analysing testing patterns in primary care to help standardise practice, and help deliver better value to the whole health economy through more effective use of testing.
- Specialised programme focusing on HbA1c testing for management of patients with diabetes; analysing (anonymised) patient level data to calculate optimum re-test intervals, and providing detailed information to help clinicians understand how to achieve better results for patients.
- Detailed analyses of laboratory-level testing to help standardise testing practice, utilisation of new and redundant tests, standardisation of panels/profiles, and network-wide optimisation of testing.

## Why Demand Optimisation in Pathology is Important

When Lord Carter of Coles' "Report of the Second Phase of the Review of NHS Pathology Services in England" was published in 2008, it highlighted a range of ways in which NHS Pathology providers could work more efficiently without diminishing the quality or value of their service.

The Pathology Quality Assurance Review, published in January 2014 (Dr Ian Barnes), then provided further narrative around improvement in quality, albeit with a strong acknowledgement that NHS Pathology departments already deliver a high quality service. It highlighted that "NHS pathology services compare favourably with the rest of Europe, and have multiple measures in place to ensure that the results they produce and the advice that they give is of high quality". It also went on to state that "The NHS in England boasts a dedicated and highly skilled workforce, good internal quality assessment and quality management systems, and mature external assurance of its pathology services that overall provides a safe, reliable and effective service."



However, with the quality of testing accepted to be at a high standard, attention shifted more towards a focus on the impact and effectiveness of pathology testing. With the NHS under constant pressure to reduce cost – and with pathology laboratories under the spotlight once again in this respect following the 2016 NHS England report – demand optimisation in pathology has rightly been identified as a relatively quick-win in terms of its potential ability to make both a hugely significant saving across the whole health economy, whilst simultaneously making a positive impact on patient outcomes.

The Benchmarking Partnership's primary care demand optimisation programmes, launched in 2006, certainly helped highlight the extent to which this is true. One of our partner laboratories achieved huge success in improving the 'wellness' of their diabetes patients through a collaborative approach to managing and effectively utilising the results from their HbA1c tests with their GPs. The following table shows the impact that their demand optimisation programme had on HbA1c levels and the number of patients that were "well controlled":

HbA1c Level Summary Analysis	Start of programme					
	2012	2013	2014	2015	2016	2017
% Patients >53mmol/mol	28.0%	27.6%	27.7%	24.4%	18.7%	15.8%
% Patients <48mmol/mol	61.2%	61.0%	61.7%	65.4%	72.6%	77.7%
Average HbA1c Level (mmol/mol)	49.0	48.4	48.8	48.6	46.4	44.0
Average Number of Monitoring Tests per Patient	1.35	1.34	1.39	1.35	1.34	1.28
Percentage of HbA1c Tests Within Guidance	41.2%	41.1%	41.9%	45.3%	49.9%	54.7%

Results were achieved through better management of patient testing, ensuring patients were tested more in line with their optimum re-test interval by tackling both ends of the scale: A reduction in un-necessary over-testing, but also increasing testing rates on those who needed it, leading to a slight increase in testing but more effective utilisation of the results. Rather than simply ‘ticking a box’ in terms of achieving QOF targets, the system took better care of acting upon results; ensuring that access to earlier warnings of potential problems were acted upon through a change in medication and/or lifestyle interventions.



Right test, right patient, right time. And then ensuring the test results form the basis of the management of that patient’s condition.

With more frequent access to information, and more contact with the patients who need it most, the whole pathway can achieve better outcomes, and as a result, significant cost savings. A major Trust in London engaged with the programme from 2013 to 2015, and in that time managed to save over £1m in diabetes bed day costs alone (based on only £350 per bed day). And this was despite the fact that one of the six CCGs didn’t engage with the programme, and actually had an

increase of over half a million pounds.

CCG Name (anonymised)	Number of Bed Days - Diabetes		Change in Bed Days		
	FY1314	FY1415	% Change	Actual Change	Change in Bed Day Cost*
CCG1	11,679	10,053	-14.1%	-1,626	-£569,100
CCG2	39,486	37,620	-5.1%	-1,866	-£653,100
CCG3	38,551	37,820	-2.1%	-731	-£255,850
CCG4	15,080	14,827	-2.1%	-253	-£88,550
CCG5	14,009	13,818	-1.1%	-191	-£66,850
CCG6	11,204	12,698	+13.1%	1,494	£522,900
<b>TOTAL</b>	<b>130,009</b>	<b>126,836</b>	<b>-2.1%</b>	<b>-3,173</b>	<b>-£1,110,550</b>

\*Based on £350 per bed day

Of course, our research has also shown that better management of diabetes patients can also help manage other co-morbidities. More regular HbA1c testing is linked with better management of cholesterol, for example. And the same can be said for a wide range of other conditions, which will in turn help reduce the risk of admissions and therefore reduce cost in secondary care (as well improving outcomes for the patient!).

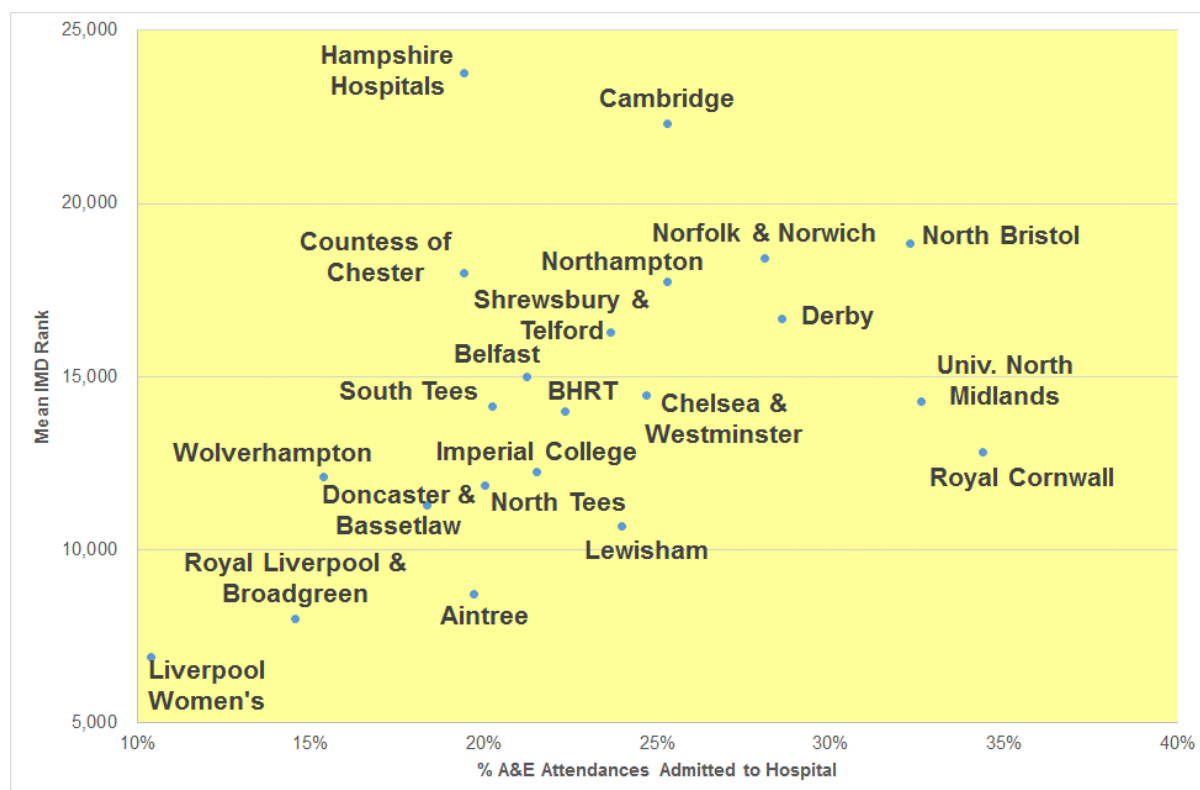
And this is all before we even begin to look at management of specific tests. Vitamin D is often massively over-requested, and can generate significant savings through demand optimisation, for example. Massive variation exists within GP practices around requesting of specific routine tests, where many are un-necessarily requested.. and, of course, also not requested when they *should* have been.

Demand Optimisation is a relatively quick and inexpensive way to achieve quick results, both in terms of reducing cost, but more importantly in terms of improving patient outcomes.

## Introduction to Demographics: Understanding The Impact Demographics Have On Your Service

The demographics of the population you serve will impact on your service, from the prevalence and severity of certain conditions to the number and types of admissions to hospital.

Data show that in areas of higher deprivation, there will be a higher overall number of admissions to hospital per 1,000 patients than in areas of lower deprivation. However, this means that the admission *rate*, ie the percentage of patients who present at hospital who are then admitted, is *lower* in areas with higher deprivation. This is because the denominator (ie the number of people who present at A&E) is so much higher.

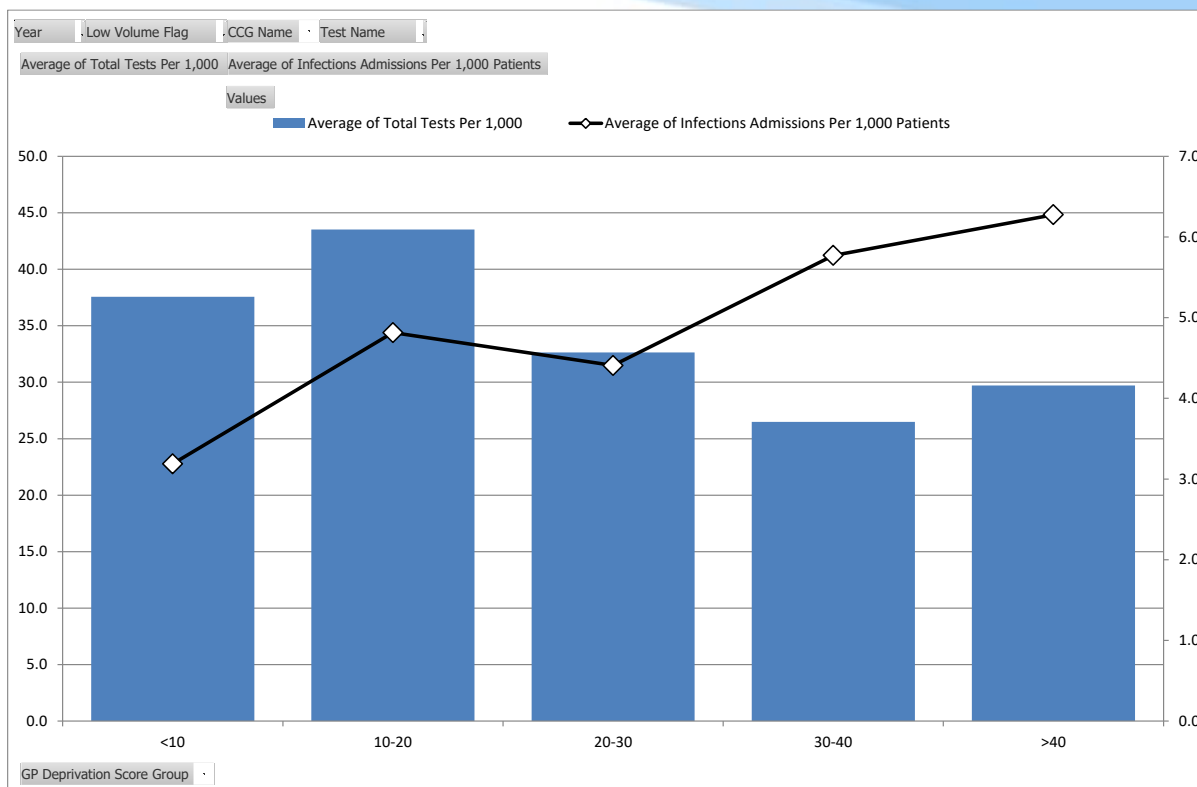


So, before you've even begun to look at testing rates and demand optimisation, there will already be an expectation when it comes to admission rates from your CCG, based on your overall deprivation score. However, we've also observed that the deprivation score can relate directly to pathology requesting patterns as well.

The following table shows the relationship between deprivation score (in this example deprivation score is split into quintiles across the group) and testing rates for Lipids (per 1,000):

	Average Deprivation Score	Average Lipids Tests per 1,000 (GP)
(Least Deprived) Lowest Quintile	9.5	51.6
Second Quintile	16.8	52.6
Middle Quintile	30.1	57.6
Fourth Quintile	39.3	69.1
(Most Deprived) Highest Quintile	50.0	68.2

Clearly there's a relationship between deprivation and testing rate for Lipids, and the same is true for a range of other tests. And, of course, there is also a relationship between testing and outcomes. The following chart triangulates data for deprivation, infections admissions, and testing for related infection markers (urine culture and CRP).



From here you can see that the areas with lowest deprivation (left hand side of the chart) have a higher test rate (blue bars), but also a lower admission rate (floating black and white dots on second axis).

Once again, even without looking into specific figures for your CCG, there will already be a certain expectation when it comes to testing, and associated outcomes.

However, deprivation isn't the only impact factor. Age is just as significant, if not more so. Common sense dictates that if you have an older average age within your population, the chances are you will be managing more long-term conditions (and testing more frequently in associated areas of pathology) and more conditions related to end-of-life. You will likely be managing a higher prevalence of a whole range of conditions, including Diabetes, Chronic Kidney Disease, and Stroke.

The following table shows a list of primary care key marker tests which are typically requested more per 1,000 patients in older populations:

Test Rate per 1,000	Youngest	% Pop Over 65			Oldest
	<10%	10-15%	15-20%	20-25%	>25%
Biochemical Profile	217.6	243.2	259.4	305.1	280.8
Full Blood Count	221.2	215.2	218.8	231.7	244.4
C Reactive Protein	65.2	63.5	77.5	85.5	88.9
BNP (NT-pro)	4.6	4.8	6.2	7.6	9.7
Haemoglobin A1c	117.7	125.0	128.1	144.0	152.3
INR	2.5	6.6	7.0	27.4	23.5
Lipids	113.5	113.1	115.3	116.5	135.0
Lithium	1.1	1.2	1.2	1.5	1.9
Prostatic Specific Antigen	12.2	14.6	17.0	18.0	30.4
Urine Albumin/Creatinine Ratio	22.0	23.4	30.8	45.4	33.8
Urine Culture	24.2	27.9	32.0	38.4	39.1
Urine Flow Cytometry	43.8	49.6	53.0	61.7	64.8

The table shows that ‘typical’ workload, as proxied by Biochemical Profiles and Full Blood Counts, is higher in older populations (right hand side of the table). Marker tests for other specific conditions, such as HbA1c (for Diabetes) are also included. Tests rates can be as much as twice as high within populations where >25% are over 65, compared with <10% (in fact INR testing is almost 10x higher).

However, that’s not to say that *all* testing rates are higher in older average populations. Some tests are requested more frequently in younger average age populations, as the following table demonstrates:

Test Rate per 1,000	Youngest	% Pop Over 65			Oldest
	<10%	10-15%	15-20%	20-25%	>25%
25-Hydroxy Vitamin D	29.0	21.9	22.6	19.3	16.2
FSH and LH	14.4	9.3	9.0	7.0	6.8
Rheumatoid Factor	13.5	8.2	8.2	7.0	6.5
Serum Folate	99.0	80.0	66.4	64.7	51.7
Vitamin B12	108.3	89.3	76.1	75.9	72.4

Interestingly, Vitamin D testing rates are almost twice as high in the youngest population group compared with the oldest group. Same applies to FSH and LH testing, Serum Folate Testing, and Rheumatoid Factor (ie around twice the test rate).

Meanwhile, we are also able to report data on the percentage of patients with long standing health conditions, which of course also impacts on testing rates. Once again if we use the Full Blood Count test as a reasonable proxy for ‘normal’ workload in primary care, the following table shows the impact that a high proportion of patients in this category can have:

FBC Test Rate per 1,000 Patients	
% Patients with Longstanding Health Conditions <40%	214.5
40-45%	213.7
45-50%	221.3
50-55%	260.6
55-60%	269.3
>60%	274.0

When we bear in mind that the number of FBC tests performed in an ‘average’ laboratory in the UK is around half a million, this can have a significant impact on workload and cost.

It is therefore very important to note the impact that demographics will have not only on your secondary care outcomes, but also in terms of the types and relative rates of each pathology test you might expect to request over the course of the year.

Coupled with the fact that performance in each pathway will vary between CCGs – and in fact will vary by practice even *within* each CCG – there is no such thing as a “one size fits all” approach when it comes to demand optimisation in pathology. It is therefore extremely important to understand both the demographics of your population, as well as the performance of each CCG (and their respective GP practices) within each pathway, to determine where the best opportunities for success lie.

In a climate where clinicians usually have to choose between “what’s best for the patient” and generating cost savings, demand optimisation presents a rare opportunity to achieve both simultaneously. Furthermore, where most strategies which intend to achieve one or both of these outcomes would usually require a significant investment of both time and resource (cost) to achieve results, demand optimisation strategies present a unique opportunity to achieve quick results with relatively little up-front financial investment.

This report has been compiled and produced by The Benchmarking Partnership.

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