

Using Simulation to Redesign the Patient Pathway



Challenge

To work with Johnson and Johnson Vision's key customer to improve the efficiency of cataract services to enable more patients to be treated within the existing services.

Solution:

Using simulation we identified efficiencies that enabled more patients to be treated with the existing resources.

Results:

Redesign of the pathway led to an additional 35 patients being treated each week, in excess of 1,680 per year.

The Hypothesis...

University Hospitals of Leicester NHS Trust (UHL) was facing major challenges with its ophthalmology services. Just like many other UK trusts, its teams were working at near capacity but, as patient demand continued to grow, resources were becoming more stretched. The escalating demand was placing particular pressure on cataract services, where processes and systems were still based on an old model that had been built to support lower volumes of patients. The trust recognised that its cataract pathway needed to be much more efficient.

Johnson and Johnson Vision wanted to improve long term relationships and become a valued partner of UHL.

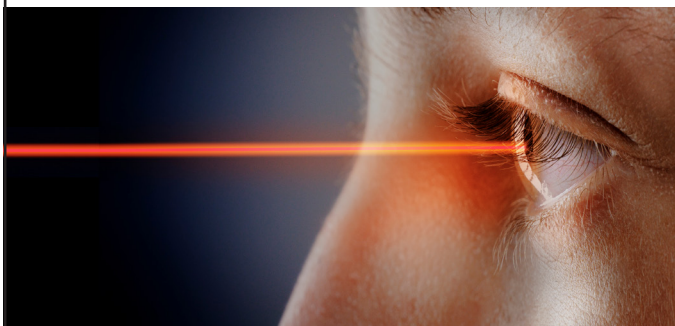
Subsequent efforts to redesign the pathway using discrete event simulation to plan and predict demand, and effective implementation techniques, have helped UHL increase the capacity and throughput of its cataract services without the need for additional resource. It is anticipated that the new pathway will enable the trust to treat almost 1,200 extra patients each year, increasing its income without incurring further costs.

As NHS ophthalmology services come under increasing scrutiny at the national level, the UHL experience provides an exemplar in cataract pathway design.



The National Context...

Rising demand for ophthalmology services in the UK is placing renewed pressure on local NHS organisations to redesign their cataract pathways. Hospital outpatient activity for 2015/16 shows that over 8% of patients attending outpatient appointments in England went to an eye clinic, making ophthalmology the second most visited treatment speciality behind trauma and orthopaedics. The treatment of cataract patients is a prominent feature within these services. According to 2017 NICE guidance, cataract surgery is the most commonly performed elective surgery in the UK, with over 370,000 operations performed in England alone in 2015/16. Moreover, as the UK's ageing population grows in number, demand for cataract surgery is increasing significantly. The trend, along with mounting concern that delay in treatment risks an increase in the number of patients losing their sight, has led to a renewed focus on improving cataract pathways. In 2016, the Royal College of Ophthalmologists published a Three Step Plan to improve eye services in hospitals. The plan recommended a range of models to help ophthalmology departments and in particular; the way forward for cataract services to maximise capacity and optimise resources.



The Local Challenge...

UHL is one of the biggest and busiest NHS Trusts in England, providing acute services to a population of around 1 million people. Its eye department included 14 consultant ophthalmologists and a large team of doctors, nurses, optometrists, orthoptists, technicians, clerical staff and management. It had 3 outpatient clinics, 3 operating theatres and an eye emergency department.

The ophthalmology department accounted for around 35% of the trust's total outpatient activity, delivering more than 100,000 appointments and conducting around 6,000 day case procedures each year. However, despite its significant output, UHL capacity for ophthalmology care struggled to keep pace with the ever-increasing demand for services. The challenge reflects a general trend in healthcare services across the region. In their 2017/18 – 2018/19 Operating Plan local CCGs jointly noted a cross-region financial challenge as demand and demographic growth for services outstrip the increased resources available year on year. The CCGs' combined 5-year Sustainability and Transformation Plan (STP), submitted in 2016, aimed to address the gap between resource and demand – and urged collaboration and innovation to design more efficient and effective high quality services.

Redesigning the Cataract Pathway...

In 2017, UHL set about redesigning its cataract surgery pathway to unlock additional capacity and drive an improved patient experience. The project, sponsored by Johnson and Johnson Vision, set out to establish whether aggregated improvements in suboptimal aspects of the current pathway could generate sufficient efficiency gains to enable the trust to increase the average number of patients on the surgery list from six to seven. The programme was designed in collaboration with key internal stakeholders from across the organisation, culminating in a full project implementation plan that was formally approved by the Chief Executive's office.

“The simulation enabled us to easily communicate the advantages of improving in the patient pathway”

Two additional NHS managers, supported by industry sponsorship, were commissioned to implement the project. The programme, which was carried out across 33.5 days, combined detailed pathway mapping with predictive analytics to determine the real- world capacity of the service.

Mapping The Pathway...

The process began with a forensic analysis of the existing patient pathway to identify barriers and potential opportunities for improvement. The analysis highlighted inefficiency in the admission, transfer and discharge of patients – all of which were being managed by one nurse. This was creating avoidable delays in the flow of patients through the process. These delays were exacerbated by poor communications; patient correspondence/admission letters were dated and used old information, whilst signage at the facility – which was spread across two floors – was confusing. These aspects commonly slowed down patients' transition through the service. In combination, these inefficiencies had a negative impact on the length of time patients were in the department from end- to-end. This, in turn, influenced the number of patients on whom UHL could physically perform cataract surgery on any given day. Simple improvements in these areas could minimise time wastage and create additional capacity to increase patient numbers.

Evaluation and Predictive Analytics...

The redesign process was facilitated by a computer-based simulation of the cataract pathway to plan the new service. The Trust used OCCUSIM, a discrete event simulation, to measure the impact of restrictions in the pathway as well as modifications in the model designed to address them. OCCUSIM is an interactive planning tool that produces forecasts of demand for a Trust's ophthalmology service and predicts the resources required to meet this demand. Based on a composite of HES data, patient level data and information about the Trust's resources, OCCUSIM combines statistical forecasting methodologies and sophisticated simulation software to generate accurate forecasts.

These included:

- ☑ The number of first and follow-up appointments
- ☑ Utilisation of the Trust's clinics, theatres and beds
- ☑ Staff utilisation and service hours
- ☑ The number of diagnostic and treatment procedures to be carried out
- ☑ Revenue and costings
- ☑ Requirements for staff

OCCUSIM, which has been developed and tested in collaboration with ophthalmology experts to ensure it captures the complexity of the ophthalmology pathway, creates a virtual model of a Trust's cataract service – so at any point, UHL could make changes to the resources and measure the impact this had on its key metrics. The tool enabled the Trust to explore different resource improvement options quickly and easily, helping it identify the best solution in a risk-free environment.

The simulation was run many times to generate a body of evidence to help the Trust choose the most appropriate course of action.

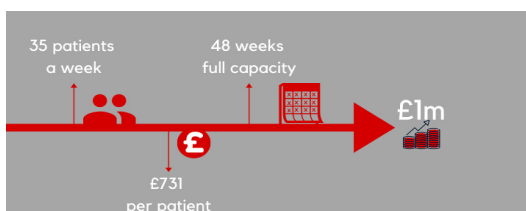


Key Learning...

Following a detailed review of the pathway evaluation and OCCUSIM simulations, the following improvements were applied to the service:

- ☑ The admission letter was rewritten and improved to make it easier for patients to find the correct admission desk.
- ☑ New, clear signage was introduced to improve the movement of patients when they are in the hospital.
- ☑ The process of transferring patients from the waiting area to theatre, which had become unclear and was being carried out by a variety of hospital staff, has been formalised to provide clarity and apportion specific responsibility.
- ☑ Introducing additional lists when theatres were not in use.

OCCUSIM compared the number of patients that could be treated if the patient lists were increased by +1, +2 and +3 patients. However, since the simulation takes into account other important restrictions in the pathway – such as the number of operating theatres and available surgeons – it became evident that these factors ultimately limit the capacity within the service. The simulation showed that a proportionately lower number of patients were able to be treated when the increase in the patient list moved from +2 to +3, simply because other restrictions limit the capacity of the service.



The Conclusion...

At a time when the NHS is experiencing a significant imbalance between demand for ophthalmology services and Trusts' capacity to deliver services, innovation that optimises existing and limited resources is critical. The project at UHL provides further evidence that NHS organisations can improve the effectiveness and efficiency of cataract services with the measured and evidence-based introduction of a lean pathway.

The Outcomes...

In its first wave of changes following the pathway redesign, UHL plans to perform cataract surgery on an additional 35 patients each week without needing to increase its existing resource capacity. With each procedure yielding potential income of £731 per patient, the Trust could increase its income by as much as £1m over the course of 48 weeks of the year at full capacity dependent on negotiations with CCGs.

To find out more about how simulation can help your business, please contact us:

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