

Consultation Document

Cataract Workforce Guidance

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1 Introduction

Cataract surgery is the UK's most common elective operation, with approximately half a million operations performed each year (1). It is one of the most cost effective, efficient, and successful operations in modern healthcare (2). Data analysis published in the Way Forward (3) document in 2017 predicted that there will be increase in demand for cataract surgery of 25% over the next 10 years, emphasising the need to create additional capacity.

'The Way Forward' also found that ophthalmologists around the UK are locally redesigning their services in response to increasing demand. Frequently used approaches to maximise cataract service capacity included: better management of case complexity, multidisciplinary workforce development and integration with community optometry.

However, our training data demonstrated that the ophthalmic medical workforce growth is not aligned with this trajectory. All ophthalmic training posts are filled each year and there are 4 times as many applicants as there are training posts, so the challenge is not finding doctors to train, but providing enough training posts.

However, Health Education England has confirmed that they are unable to increase training numbers without taking posts away from other equally understaffed specialties. Our workforce census in 2016 and 2018 (4) also showed significant gaps in the workforce because of historical training numbers have not kept pace with service demand. The number of trainees awarded a Certificate of Completion of Training (CCT) is approximately 74 while the number of doctors or doctors awarded a Certificate of Eligibility for Specialist Registration (CESR) each year on average is 11*. This is nowhere near enough to fill current and future consultant posts (4).

The 2019 Getting It Right First Time (GIRFT) Programme National Specialty report for ophthalmology (5), endorsed by the RCOphth, included three recommendations for cataract surgery:

1. Improve conversion rates for patients referred for cataract surgery to 80-85% by implementing consistent referral criteria, improving training for community optometrists, and using shared decision-making tools during the referral process.
2. Deliver routine cataract surgery in a maximum of 30 minutes of theatre time, through streamlining turnaround processes.
3. Use locally commissioned primary care optometry services to review patients who have had uncomplicated / routine cataract surgery and have no serious ocular comorbidity

This document quantifies the demand for cataract surgery in the UK for the next ten years. It then makes evidence-based recommendations on the optimum model(s) of care for cataract surgery services as well as the optimum workforce required to deliver a safe, sustainable cataract service that is clinically effective as well as cost effective.

* Based on a five year average from 2015-2019

Along with practical guidelines for clinical pathways we have developed a 'workforce calculator tool' that will predict demand for cataract surgery and the multidisciplinary staff required to meet this demand for a given population.

Current practice, and why there is scope for change

There is a wide variation in currently accepted pathways for cataract surgery. The GIRFT findings for cataracts (5) identified three key areas where improvements could be made.

The first was improving conversion rates for cataract referrals. They recommended an 80-85% conversion rate, but the average was found to be 71% resulting in wasted hospital appointments. We have designed pathways to achieve at least a 90% conversion rate in a COVID-safe environment with an emphasis on continuity of care and the patient experience. These pathways allow for planning of operating lists to utilise theatre time appropriately whilst also providing time for complex cases and training.

The second is the number of cataract operations performed on an operating list. Again, there is a wide variation with some units performing 12 operations on a four-hour list and some only operating on four patients. The mean was seven cases. When we consider how long modern cataract surgery takes, most surgeons are capable of performing a case in 20 minutes. It is generally the turnaround time in theatre that is the rate limiting step. We have worked closely with nursing staff in both ward and theatre areas to optimise patient flow and minimise hospital exposure to patients.

With appropriate staffing, training and skill mix more cases can be performed in a safe, non-time pressured environment which will benefit patients through shorter waiting times for surgery. There are considerable differences in case complexity with differing risk factors so it is essential for surgeons to devote adequate time to planning surgical operating lists incorporating sufficient time for complex cases and training.

The third is post-operative care. Currently just 27% (3) of patients are discharged to primary care. Most patients who have routine, uncomplicated surgery can be safely discharged to a trained optometrist for post-operative review. Recent studies have shown that over 60% of patients can be discharged to a community optician review with a very low (1-2%) re-referral rate (6-8). The decision for review either in the community or hospital eye service must ultimately be the responsibility of the operating surgeon. Only patients who have had complicated surgery and significant ocular co-morbidities should be seen by the hospital eye service post operatively.

We have designed pathways incorporating the work of other groups that are flexible and can be adapted to community-based and hospital-based settings. The community-based pathway would involve Optometrist led referral refinement and assessment prior to referral for surgery. The hospital-based pathway is a streamlined improvement for patients referred using existing GOS18 referrals processes.

We took into account the wide variation in case complexity and risk factors in cataract surgery as well as the essential need to train surgeons, so the pathways are flexible enough to allow for complex cases and differing levels of surgical skill. We have prioritised patient safety and aimed to minimise patient exposure to the hospital environment in the post COVID World.

The pathways can be easily adapted for every eye department to optimise patient care and maximise efficiency. However, this cannot happen without appropriate training, adequate multidisciplinary staff with the required skills and agreed standard operating procedures [SOPs].

The 'Workforce Calculator Tool' that we have developed allows proactive evidence-based identification of the demand for cataract surgery for a given population and the surgical and support staff required to meet this demand. This is particularly important as cataract surgical rates vary greatly among economically developed countries from 4000 to 10,000 per 1 million population annually (9).

2 Objectives

- To describe pathways of care to provide safe, efficient, and sustainable cataract services within the Hospital Eye Service
- To determine the surgical and multidisciplinary workforce required to support these pathways
- To calculate the demand for cataract surgery in the UK from the population aged over 50
- To build prediction models to calculate the workforce required to meet the demand for cataract surgery for specific populations

The project will concentrate on the optimum workforce required to deliver the hospital component of the pathway but acknowledge the community pre and post-operative assessment options as well.

The recommendations are:

- Evidence based
- Applicable UK wide
- Limited to adult cataract surgery only
- Complement out of hospital pathways and acknowledge the development work undertaken by other groups to develop this e.g. NHS England Eye Care Restoration & Transformation programme.
- Compliant with NICE guidance and GIRFT report recommendations
- Provide adequate experience to ensure an adequate supply of trained surgeons for the future
- Applicable to all providers of cataract surgery services in both the NHS and the independent sector.
- Designed to provide guidance on Immediate sequential bilateral cataract surgery for appropriate patients [IBSCS] (10)

Out of scope:

- Organisation of community optometrists for pre-operative assessment and post-operative reviews
- Level of appropriate training for allied health professionals. Royal College of Nursing and College of Optometry provide guidance.

- An absolute minimum standard for cataract numbers on an operating list
- Mixed operating lists

Key questions:

1. To identify the rate of cataract surgery required to meet the demand from patients over the age of 50 over the next 10 years in the UK with sub group analysis
2. To describe models of care to provide a safe, efficient and sustainable cataract service within the Hospital Eye Service
3. To determine the workforce required to support each model of care
4. To build prediction models to calculate workforce requirements for specified populations.

The project will concentrate on the optimum workforce required to deliver the hospital component of the pathway but acknowledge the community pre and post-operative assessment options as well.

3 Methods

Representatives of all interested parties and regions of the United Kingdom were invited to participate in the Cataract Workforce Guidance Development Group (See section 7.4).

A chair was selected through a competitive interview process: Mr. Jonathan Bhargava, Consultant Ophthalmologist, Countess of Chester Hospital, Chester.

Initial meetings were held individually by Mr Jonathan Bhargava and Ms Laura Coveney from the RCOphth with all parties to discuss current practice as well as hopes and aspirations for future development. These discussions and experiences formed the basis for the clinical pathways outlined below.

The COVID-19 pandemic then intervened, and we rapidly adapted the proposed pathways which were then incorporated into RCOphth guidance on restarting and providing cataract safely in compliance with NHS Covid pandemic requirements.

The Cataract Workforce Guideline Development Group [CWGDG] then discussed and refined the clinical pathways, and workforce guidance while developing the “Workforce Calculator Tool” to calculate the workforce required for a given population.

Following the completion of the guidelines, a consultation of clinical leads, nurse managers and business managers was conducted.

4 Recommendations: Cataract Surgery Pathways

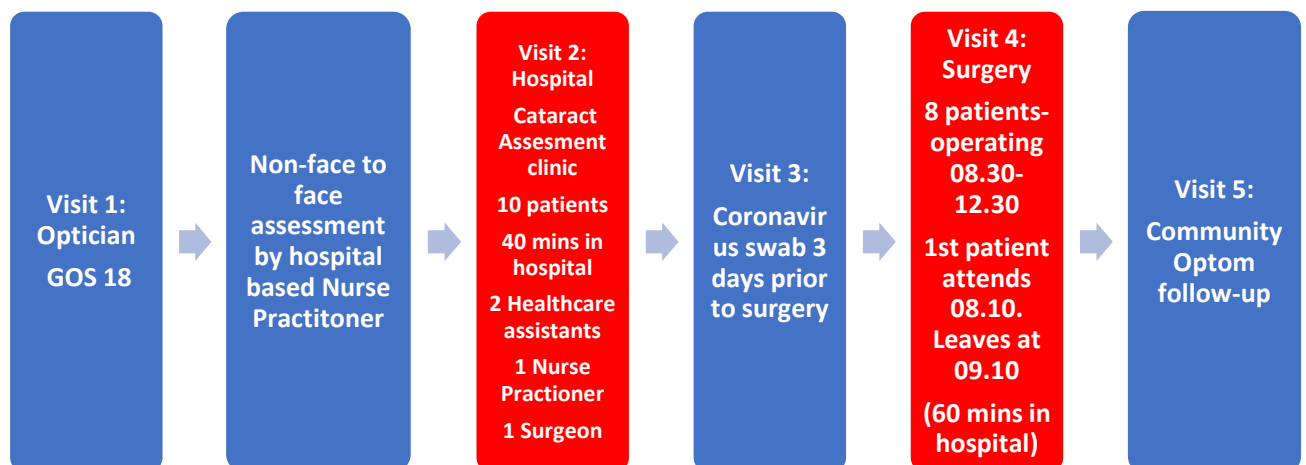
The CWGDG has developed two separate pathways for cataract surgery and an immediate sequential bilateral cataract pathway.

We are aware of the widely differing configurations of Eye Departments, and would strongly recommend that clinical facilities and reception areas for patients having cataract surgery are in close proximity to the operating theatre to optimise patient flow.

We have followed the GIRFT recommendation of a maximum 30 minute turnaround time for cases which allows for eight cases to be performed on a four hour operating list, however this should be regarded as a minimum.

Below is a detailed description of the pathways with recommendations for staffing levels and training.

Hospital based cataract pathway



Visit 1: Initial referral

- Assessment by optometrist
- If cataract is found and the patient wishes to proceed to surgery, refer to the local or 'choose and book' cataract service

Virtual assessment

- An experienced health care professional will contact the patient to discuss cataract surgery, its benefits and risks as well as the specific risks of Covid infection. This practitioner should be familiar with the risks and complications of cataract surgery and Covid infection to facilitate an informed discussion with the patient.

- The Royal College of Ophthalmologists 'Shared Decision-Making Tool' (Appendix 1) should be used.
- If the patient wishes to proceed, a nursing assessment will be performed and the 'Cataract listing proforma' (Appendix 2) filled in. This document will follow the patient throughout their visits.
- If the patient is suitable for local anaesthesia (the majority), the patient will be given an appointment to a cataract assessment clinic for biometry, dilated examination and consent by a suitably qualified professional.

Patients requiring general anaesthetic need to be seen and assessed via a specific clinical pathway. The 2020 RCOphth National Ophthalmology Data Report on the National Cataract Audit noted only 6,310 (4.4%) first eye surgery patients and 3,864 (3.9%) second eye surgery patients, were operated on under general anaesthesia or combined with local and/or topical anaesthesia (11).

Visit 2: Cataract Assessment clinic

- Check visual acuity and biometry and dilate the pupil.
- Check blood pressure, temperature and pulse.
- Discussion about admission for cataract surgery, post-operative care, COVID swabs and provide an information leaflet.
- The surgeon will take a history and examine the patient.
- If cataract surgery is deemed appropriate it will be discussed with the patient. If the patient wishes to proceed, consent of specific needs of the patient will then be taken (12-13). The patient will need to be informed that the surgery may be performed by a trainee (14-15)
- The listing form is completed by the surgeon and an appropriate amount of operating time assigned depending upon case complexity or whether a trainee is performing the surgery
- This will allow the surgeon to accurately plan and fully utilise the operating list. (Appendix 4)
- The date and time to attend for surgery should be confirmed with the patient
- They should be provided with dilating drops to be self-instilled one hour prior to surgery to reduce the time spent in hospital by the patient.
- Clear written instructions will be given to the patient. (Appendix 3)

Visit 3: Patient attends for a coronavirus swab (whilst NHSE guidelines require this)

Visit 4: Surgery day

- Appointment times should be staggered to allow for social distancing and patients should be invited to attend 15 minutes before surgery.
- The patient will be reviewed by nursing staff, ideally by the same nurses seen at the assessment.
- On admission, the nurse will confirm the eye to be operated upon with the patient, consent form and operating list and then mark the eye to be operated on in line with local policies and the World Health Organisation [WHO] Surgical Safety Checklist.
- The same nurse will take the patient to theatre and instil local anaesthetic drops and povidone iodine 5%.

- The surgical team will confirm the patient's identity, the eye to be operated upon and check the biometry for the appropriate intraocular lens implant in compliance with the WHO Surgical Safety Checklist and local policies
- Patient to be reminded that a trainee will be contributing to the surgery under supervision (14-15)
- Whilst patient 1 is in theatre with nurse 1 and scrub nurse 1, patient 2 will be being admitted by nurse 2
- Nurse 2 will bring patient 2 to the anaesthetic room ready to be seen by the surgeon
- Scrub nurse 2 will be preparing the surgical equipment for patient 2
- When surgery has been completed, nurse 1 will escort the patient to the discharge lounge
- The surgeon records the procedure then sees patient 2 in the anaesthetic room and the whole process starts again. (Appendix 4)
- Nurse 1 will confirm follow up arrangements at a community optometric practice that is participating in a post-operative cataract assessment system at around 4 weeks post-operatively with the patient
- The patient will be informed how to contact the surgical unit in the event of any post-operative concerns

Visit 5: Community Optometrist

- Post-operative examination to include refraction, anterior segment examination and intraocular pressure measurement
- Inform the cataract service of the postoperative outcome including refraction
- Refer for second eye surgery if appropriate

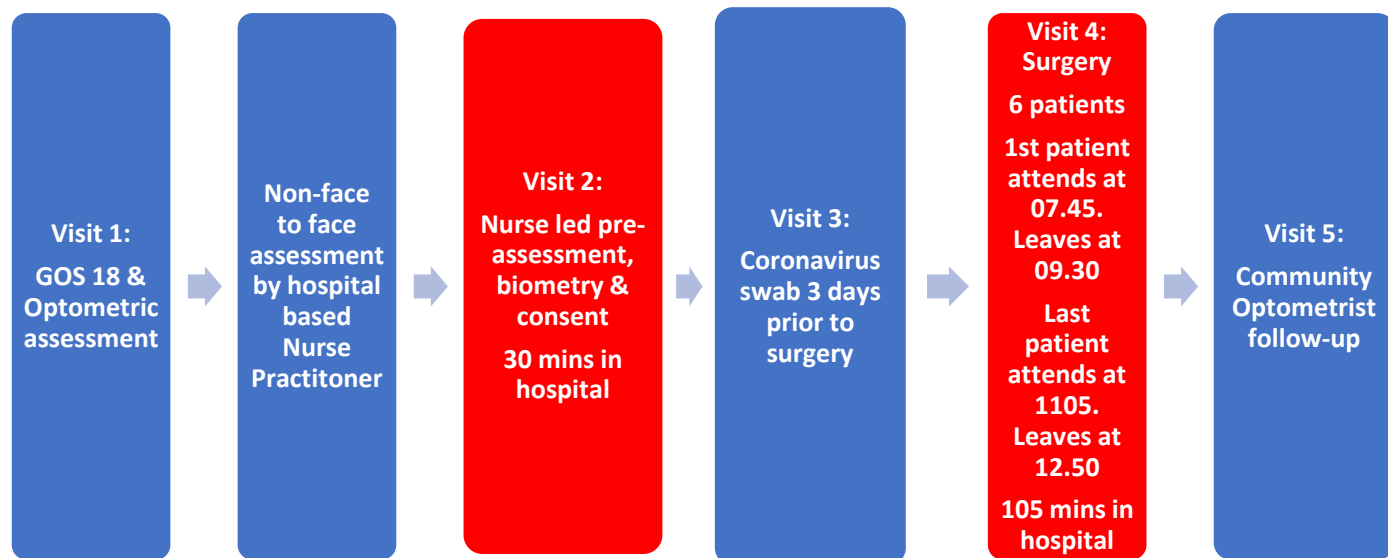
Summary:

- 6 patient 'events'
- 5 patient visits
- 3 in community
- 2 in hospital
- 1 telephone consultation
- 100 minutes in hospital
- 8 eyes of 8 patients = 240 minutes of operating in a 240 minute (4 hour) session

Staffing requirements

- 2 theatre scrub nurses
- 2 theatre support workers
- 2 ward staff nurses
- 2 ward healthcare assistant
- 1 surgeon

Community based cataract pathway



Visit 1: Initial referral

- Assessment by an Optometrist
- If cataract was found and the patient would like to consider surgery, the Optometrist should examine and discuss cataract surgery.
- Referral to cataract provider for pre-operative assessment if the patient would like to proceed with cataract surgery.
- This 'referral refinement' will minimise unnecessary hospital appointments (5)

Virtual assessment

- Telephone assessment by an appropriately trained Health Care Professional who follows the same protocol as for the hospital-based pathway
- If the patient wishes to proceed, a nursing assessment will be performed and the 'Cataract listing proforma' (Appendix 2) completed.
- An appointment would be made for the patient to attend a Nurse-led pre-admission assessment clinic for biometry and consent

Visit 2: Nurse-led Cataract Assessment clinic

- Blood pressure, pulse and visual acuity checked
- Biometry will be performed by an appropriately trained healthcare professional
- If the patient is medically fit and cataract surgery is deemed appropriate it will be discussed with the patient
- If the patient wishes to proceed, consent will then be taken by an appropriately trained healthcare professional
- Current COVID guidance and the need to attend for a coronavirus swab 3 days prior to surgery will be discussed in accordance with local NHS guidance
- The patient should be given a date and time to attend for surgery
- The patient should be provided with dilating drops to be self-instilled one hour prior to surgery to reduce the time spent in hospital by the patient
- Clear written instructions will be given to the patient. (Appendix 3)

- The listing form is completed by the Nurse
- A standardised operating list should be completed to ensure adequate surgical time.
- Patients would be asked to attend 30 minutes prior to their surgery to allow for admission and surgical assessment. Please see Appendix 6 for an example surgical timeline

Visit 3: Patient attends for a coronavirus swab (whilst NHSE guidelines require this)

Visit 4: Surgery day

- On the day of surgery, the patient will attend already 30 minutes prior to their surgery time diluted in a staggered manner to reduce interactions and allow for social distancing.
- The patient will be admitted ideally by the same Nurses as at the assessment
- The Nurse will confirm the eye to be operated upon with the patient, consent form and operating list and then mark the eye in compliance with the WHO Surgical Safety Checklist and local policies.
- The patient should meet and be examined by a member of the surgical team
- The Nurse would then take the patient to theatre and instil local anaesthetic drops and povidone iodine 5%
- The surgical team will confirm the patient's identity, the eye to be operated upon and check the biometry for the appropriate lens implant in compliance with the WHO Surgical Safety Checklist and local policies
- Whilst patient 1 is in theatre with Nurse 1 and Scrub nurse 1, patient 2 will be being admitted by nurse 2
- Scrub nurse 2 will be preparing the surgical equipment for patient 2. Nurse 2 will bring patient 2 to the assessment room ready to be seen by the surgeon
- When surgery has been completed, nurse 1 will escort the patient to the discharge lounge
- The surgeon records the procedure then sees patient 2 in the anaesthetic room and the whole process starts again. (Appendix 5)
- Nurse 1 will confirm follow up arrangements at a community optometric practice that is participating in a post-operative cataract assessment system at around 4 weeks post-operatively with the patient. The patient will be informed how to contact the surgical unit in the event of any post-operative concerns.

Visit 5: Community Optometrist

- Post-operative examination to include refraction, anterior segment examination and intraocular pressure measurement.
- Inform the cataract service of the postoperative outcome including refraction
- Refer for second eye surgery if appropriate.

Summary:

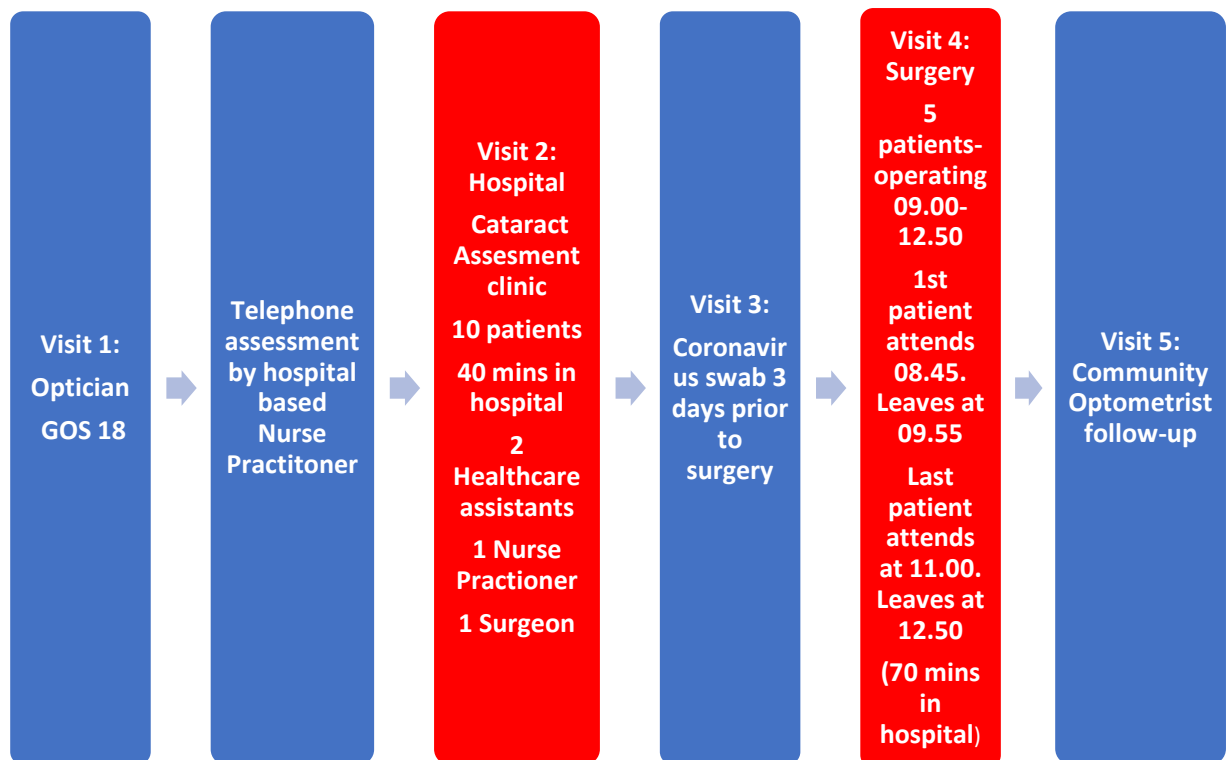
- 6 patient 'events'
- 5 patient visits

- 3 in community
- 2 in hospital
- 1 telephone in home
- 135 minutes in hospital (per eye)
- 6 eyes of 6 patients = 120 minutes of operating in a 240 minute (4 hour) session

Staffing requirements

- 2 theatre scrub nurses
- 1 theatre support workers
- 2 ward staff nurses
- 1 ward healthcare assistant
- 1 surgeon

Hospital based immediate sequential bilateral cataract pathway



- Immediate sequential bilateral cataract surgery has been advocated as it provides more rapid visual rehabilitation, less inconvenience for the patient and improved efficiency (10)
- Concerns regarding complications that could cause bilateral blindness have hampered the adoption of ISBCS. However recent studies have confirmed that visual outcomes from ISBCS or as good as after surgery at separate times with no increase in operative complications (16-20)
- In 2018-2019, NOD reported 0.20% of all cataract extractions were ISBCS. 40.1% were performed under general anaesthesia. 12.1% were unable to lie flat and 9% were unable to cooperate during the operation(11)
- In the post-COVID world, reduced time in hospital has become even more important for patient safety
- ISBCS reduces the surgical time and patient visits to the hospital whilst providing an optimum visual outcome
- Careful assessment and patient selection are even more important in this scenario and this should be done in a cataract assessment clinic led by the operating surgeon
- The assessment should include the patient's appropriateness for bilateral surgery and lack of risk factors
- Thorough counselling needs to be undertaken to ensure that the patient is aware of the risk of bilateral endophthalmitis, however small
- The patient will be in theatre for more time than that for single sided surgery and this should be considered in the assessment

- The process will be much the same as traditional pathways and the patient listed for bilateral surgery at the cataract assessment clinic. This will allow adequate additional time for ISBCS
- **ISBCS is treated as two completely different procedures**

Appendix 6 shows a possible timeline for theatre. This is the best utilisation of theatre and surgeon's time. See Table 1 for a comparison of staffing requirements and theatre utilisation for the 3 pathways.

Summary:

- 6 patient 'events'
- 5 patient visits
- 3 in community
- 2 in hospital
- 1 telephone in home
- 110 minutes in hospital for both eyes
- 5 patients (10 eyes) on operating list = 200 minutes of operating in a 240 minute (4 hour) session
- 1 cataract assessment clinic will provide cases for 2 theatre lists

Staffing requirements

- 2 theatre scrub nurses
- 2 theatre support workers
- 2 ward staff nurses
- 1 ward healthcare assistant
- 1 surgeon

Benefits and risks

The benefits of all pathways are the streamlining of patient care, minimising patient-patient and staff-patient contact while optimising use of theatre capacity.

In the community setting, the patient would be made aware by the assessing optometrist of the pathway and likely waiting time.

In the hospital based setting, cataract assessment clinics should be performed within a couple of weeks of the planned operation date, precluding the need for preoperative assessment on the day of surgery by the surgeon. Patients are given dilating drops to instil themselves on the day of surgery which minimises time in hospital.

Post-operatively, the discharge process should be swift as there is ample time for a comprehensive discussion with the Nurse who has accompanied the patient throughout their visit.

Community based post-operative clinics at an optometric practice of the patient's choice would reduce the number of hospital visits. Robust systems are already in place in many

areas to provide this service. Second eye surgery could then be requested by the optometrist and the patient automatically booked by the hospital.

Inappropriately booked patients in either pathway could cause delays or cancellations on the day of surgery. Experienced staff performing the assessments and referrals are therefore vital along with multidisciplinary auditing of pathways and outcomes.

Specific arrangements are needed to ensure that the very small number of patients requiring sedation / general anaesthesia received surgery without excessive delay.

Any patient who is found to be COVID-19 positive would need to isolate for 2 weeks, in compliance with NHS guidelines and then be re-tested prior to surgery.

The community-based pathway would be ideally suited to those operating lists where both a Consultant and trainee are present as this would enable one of the surgeons to operate whilst the other performs the assessment on the next patient. If there was just one surgeon operating and assessing, there would be a significant amount of time in which the operating theatre is not being utilised. This would also interfere with the surgical flow of patients.

Accurate and reliable assessments are required in both pathways.

Steps in the pathways involving primary care optometrists would need to be commissioned at a local level.

Good practice points

The coronavirus pandemic has made it mandatory to minimise patient's exposure to the hospital environment. Both pathways effectively address this by reducing patient's visits and the time spent in hospital. There is a slight difference between the two in terms of number of visits, but when compared with current pathways and pre-operative assessment, the time spent in hospital is greatly reduced.

In terms of the patient experience, both pathways would improve continuity of care with just one nurse caring for the patient on the day of admission, reducing staff-patient exposure while providing ample opportunity for the patient to discuss any concerns or post-operative queries with the nurse. The choice of optometry practice for post-operative review can also be discussed.

This system would also optimise efficiency as the number of nursing handovers are reduced. Importantly, the flow in theatre would be optimised as well, leading to reduced downtime.

The hospital-based pathway would require two surgeon sessions, one for the assessment clinic and one operating list and this could facilitate either 9 cataract procedures in a 3-hour session or 12 in a 4-hour session.

Barriers to change

Changes in practice may be difficult to implement in any environment but can be particularly difficult within the NHS. All levels of staff can be reluctant to change because they are comfortable with existing established practice. Surgeons may not feel motivated to perform more cases if their peers do not.

One size does not fit all and the formation of a cohesive team of dedicated Ophthalmic staff with the same aims and goals will facilitate an environment of excellence and efficiency to the benefit of patients.

For this to happen, all staff need appropriate training for their role which in many units will require investment, time and planning.

There are many high-quality ophthalmic nursing courses throughout the United Kingdom and it is essential that staff taking on these roles have the appropriate training to ensure that they are competent and confident in their roles and with their responsibilities. No one should be in a position where they are uncertain of their role or the process.

There is always a learning curve when change is introduced, but this can be managed safely by the gradual introduction of changes and ensuring the whole team understands the need for change and its benefits to patients and staff.

Training

It is essential to provide training for the next generation of Ophthalmologists by ensuring they perform sufficient numbers, have experience of the full range of cataract cases and acquire competence in managing complications (21-22). This can easily be incorporated into either pathway and in fact, the community based pathway would function more efficiently if there was more than one surgeon present. This would allow the greeting and pre-operative assessment of one patient while the previous is having surgery, decreasing theatre 'downtime' and maximising theatre utilisation.

Appendix 5 demonstrates how a local anaesthetic hospital based pathway can be run with senior trainees (ST3-ST7) of 30 minutes case duration. A real world example case study below and appendix 7 illustrates this pathway in motion. If additional time per case is needed for more junior trainees, this can be amended on the pathway i.e. 45 minutes for ST1-ST2. Patients must be made aware that a trainee may perform the surgery under supervision as part of the consent process (14-15).

The hospital based pathway allows advance planning of theatre lists and appropriate time can be set aside for 'training'. It is essential for trainees to participate in cataract assessment clinics. This would allow trainee surgeons to assess and then operate upon the same patient. This continuity of care would allow the trainee to relate to the patient and reduce the anxiety felt by the patient and the trainee (with trainee more mentally prepared for case at hand). The cataract assessment clinics would provide a variety of cataracts that could be selected for a trainee at any level allowing operating lists to be planned safely in advance to ensure adequate time for training.

5 Workforce calculator tool

Introduction

A key objective of this project was to calculate the current and future multidisciplinary workforce, but particularly the surgical workforce, required to deliver a sustainable cataract service to meet the demand from a defined population. This requires an understanding of the current and likely future demand for cataract surgery to calculate the multidisciplinary staff required for the previously described pathways.

Forecasting the rates of cataract surgery across defined populations is not exact. Differential changes in population size, demographics and divergence from standard predictions alongside changes in disease incidence and health seeking behaviour can introduce unpredictable variation. Previous modelling studies (23) identified the relevant factors to be population size, age, gender, ethnicity and disease incidence. We developed a simple user-friendly model with the flexibility to predict workforce requirements for a range of populations and/ or organisations, as well as comparative demonstrations of how different patient pathways influence workforce requirements.

Methodology

A review of past modelling studies offered several possible models for consideration. However, to increase accessibility and versatility this workforce prediction has been based upon a linear regression model to predict future demand from hospital episode activity data for cataract extractions (England, Wales and Scotland) and mid-year population estimates for over 50 year olds between 2009 and 2019.

The model uses standard UK hospital activity data and Office of National Statistics [ONS] population predictions to estimate demand and combines these with the defined healthcare staffing requirements and the patient throughput achieved for each of the described pathways. Future demand has been estimated using ONS mid-year population predictions through to 2029.

The model calculates how many ophthalmic surgeons, nurses, healthcare assistants and community optometrists will be required to deliver a service capable of meeting the predicted and expected demand for surgery for a defined population. This is achieved through the user defined values for the proportion of surgery delivered using each described pathway, then adapting the staff requirement to deliver each pathway. A total workforce requirement is then derived. The model allows for mixed pathways on a proportional basis.

Benefits and features

- Adaptable to national/ regional / local populations
- Provides information on number of surgical lists, total annual/ weekly ophthalmologist sessions
- Allows comparison between patient pathways to compare throughput and workforce requirements
- 10-year prediction model for future planning
- Can be used to predict workforce requirements or expected/ maximal patient throughput for a specified workforce.

Assumptions and Limitations

- Population predictions can be inaccurate
- NHS hospital surgery rates map past changes in incidence
- Cataract demand remains stable
- Unit/ Consultant efficiency is constant
- Hospital Staff work for 42 weeks per year (to account for expected annual, professional and sick leave)
- Univariate model based on population over 50 provides sufficient accuracy
- Constant rate of care provision
- Cannot be used to provide an accurate estimate of incidence

How to use and interpret the results

The model provides predictions based on any defined population - national, regional or local. Shaded fields have been used to clearly identify all required user defined data items. The following describes the data needed to populate the model

Baseline year: please select starting year from the drop-down list (default 2018-19)

Population served: The model calculates the cataract requirement based upon the size of the over 50 population. If the size of the over 50 population is not known, then the size of the general population can be used and the over 50 population will be estimated based upon UK proportions.

Cataract pathways: The model provides for care through all pathways identified in workforce project. The model defaults to 100% of surgery using the standard pathway. This can be amended to replicate current provision and training requirements employing the alternative pathways. Care delivery pathways can also be adjusted to provide comparative levels of workforce requirements.

Predictions: The model will provide 10-year predictions for population changes, the associated demand for cataract surgery and workforce requirements. Forecasts for workforce requirements are presented as annual/weekly number of sessions for ophthalmologists and community optometrists, and in annual/ weekly hours for nurses and HCAs, with weekly totals based upon 42 productive working weeks per year.

Scenarios

Medium Sized District General Hospital Scenario:

To validate historical data and predict current activity and theatre requirements:

We used historical data from a medium sized district general hospital to confirm the validity of the calculator. In this scenario, there is one ophthalmic theatre that is utilised for all sub-specialities so many lists will be a mixture of cases. In 2017, 1,461 cataract operations were performed. This is approximately 35 cases per working week based on 42 working weeks in a year. This correlates well with the calculator's prediction of 5 cataract lists of 7 patients per week to deliver this level of activity. [Figure 1]

Year	Cataract requirement	Annual Surgical sessions	Community optometrist	Nurse (Hours annually)	Nurse (Hours weekly)	HCA (Hours annually)	HCA (Hours weekly)	Ophthalmologist annual sessions	Ophthalmologist weekly sessions	Ophthalmologist weekly theatre lists
Actual 2017 figures 7 cases/list	1461	209	0	3340	80	1670	40	418	10	5

However, using the latest population figures from the ONS, the catchment population from the local Clinical Care Group [CCG] is 348,000. To achieve a cataract requirement of 1,461 in the calculator for the 2017 figures, we had to use a population of 225,000. This means that this single NHS district general hospital did not provide the cataract surgical service required by its local commissioning Clinical Care Group for its population in that year. This could be for a number of reasons including patients having surgery in adjacent NHS district hospitals or by the private and/or independent sectors providers

If we use the latest population figure of 348,000, 2,260 cataract operations are required for 2020-21. Using existing pathways, this would require an extra 114 operating lists per year, or 2.5 extra operating lists per week and extra staffing as can be seen in the table below. [Figure 2]

The calculator predicts with a high degree of accuracy the number of cataract procedures that the CCG and providers in the local Integrated Care System [ICS] will need to deliver in each future year. This will facilitate prioritisation and forward planning in the delivery of services leading to optimal use of resources. This would be a significant improvement on the current situation in which commissioning decisions are frequently short term and driven by the need to respond to unacceptable waiting times for surgery caused by a lack of capacity to meet demand.

Year	Cataract requirement	Annual Surgical sessions	Community optometrist	Nurse (Hours annually)	Nurse (Hours weekly)	HCA (Hours annually)	HCA (Hours weekly)	Ophthalmologist annual sessions	Ophthalmologist weekly sessions	Ophthalmologist weekly theatre lists
2020-21	2260	323	0	5167	123	2583	62	646	15	7.5

Medium Sized District General Hospital Scenario:

To examine the effect of increasing numbers on operating lists and plan theatre and staffing requirements:

If the number of cases is increased to per list from 7 to either 8 or even 10, the number of operating lists and workforce required reduces significantly.

The theatre sessions reduce from a weekly requirement of 7.5 at 7 cases per list to 6.5 at 8 cases and 5.5 at 10.

Year	Cataract requirement	Annual Surgical sessions	Community optometrist	Nurse (Hours annually)	Nurse (Hours weekly)	HCA (Hours annually)	HCA (Hours weekly)	Ophthalmologist annual sessions	Ophthalmologist weekly sessions	Ophthalmologist weekly theatre lists
2020-21 7 cases/list	2260	323	0	5167	123	2583	62	646	15	7.5
2020-21 8 cases/list	2260	283	0	4521	108	2260	54	565	13	6.5
2020-21 10 cases/list	2260	226	0	3617	86	1808	43	452	11	5.5

Medium Sized District General Hospital Scenario:

To predict future theatre and staffing requirements:

The calculator allows prediction of future requirements. The table below shows the additional cataract requirements in 2028-29 as compared with 2020-21.

We have compared the difference between 7 and 8 cases per list and this shows that 1 extra weekly theatre list would be required under either caseload scenario by 2,028 to supply the increased demand at that time.

These examples use the hospital-based pathway. The calculator allows individual providers of cataract surgery to compare and contrast different surgical pathways as well as staffing and skill mix. This information will inform discussions between clinicians and managers on designing and providing services. It will also inform commissioning decisions by CCG's on how best to meet the demand for cataract surgery for its population.

Year	Cataract requirement	Annual Surgical sessions	Community optometrist	Nurse (Hours annually)	Nurse (Hours weekly)	HCA (Hours annually)	HCA (Hours weekly)	Ophthalmologist annual sessions	Ophthalmologist weekly sessions	Ophthalmologist weekly theatre lists
2020-21 7 cases/list	2260	323	0	5167	123	2583	62	646	15	7.5
2020-21 8 cases/list	2260	283	0	4521	108	2260	54	565	13	6.5
2028-29 7 cases/list	2549	364	0	5826	139	2913	69	728	17	8.5
2028-29 8 cases/list	2549	319	0	5098	121	2549	61	637	15	7.5

Scenario for a population of 1,000,000:

To examine the effect of increasing numbers on operating lists and plan theatre and staffing requirements:

This table shows the cataract requirement for a population of 1,000,000 people.

We compare the effect of increasing cases per list from 7 to 8 and 10.

This has the effect of reducing overall annual operating theatre sessions from 928 (7 cases) to 812 (8 cases) and 650 (10 cases).

This translates into a weekly reduction in theatre sessions from 22 to 19.5 (8 cases) or 15.5 (10 cases)

Usually there are 2 theatre sessions in a Consultant Ophthalmologists job plan. This would require 2 cataract assessment clinics – giving 4 sessions.

From the figures below, 11 Ophthalmic surgeons would be required to provide cataract services for a million people if there were 7 cases on each operating list, or 10 if 8 cases were performed. However, if 10 cases per list could be achieved, the number of ophthalmic surgeons required would be reduced to 8.

An increase of just one patient per operating list, going from the current average of 7, to 8 cases will require 7,731 less operating lists annually at a national level with a current UK population of 66,650,000. (61,845 to 54,114 operating lists).

Year	Cataract requirement	Annual Surgical sessions	Community optometrist	Nurse (Hours annually)	Nurse (Hours weekly)	HCA (Hours annually)	HCA (Hours weekly)	Ophthalmologist annual sessions	Ophthalmologist weekly sessions	Ophthalmologist weekly theatre lists
2020 7 cases/list	6495	928	0	14846	353	7423	177	1856	44	22
2020 8 cases/list	6495	812	0	12991	309	6495	155	1624	39	19.5
2020-21 10 cases/list	6495	650	0	10392	247	5196	124	1299	31	15.5

Scenario for a population of 1,000,000:

To Predict Theatre and staffing requirements for the future:

The table below shows the additional demand for cataract surgery in 2028-29 as compared with 2020-21.

Comparison of the difference between 7 and 8 cases per list demonstrates that 2.5-3 extra weekly theatre lists will be required under either caseload scenario to meet the increased demand required by 2028 according to predictions from the calculator tool.

Scenario for a population of 1,000,000:

To explore the impact of using a community-based pathway:

The hospital based and community based pathways that we have described are used to calculate staffing levels. Differing proportions of hospital based and community based pathways have been shown with the corresponding different results in terms of staffing for the same amount of cataract procedures.

Year	Cataract requirement	Annual Surgical sessions	Community optometrist	Nurse (Hours annually)	Nurse (Hours weekly)	HCA (Hours annually)	HCA (Hours weekly)	Ophthalmologist annual sessions	Ophthalmologist weekly sessions	Ophthalmologist weekly theatre lists
2020 7 cases/list	6495	928	0	14846	353	7423	177	1856	44	22
2020 8 cases/list	6495	812	0	12991	309	6495	155	1624	39	19.5
2028-29 7 cases/list	7324	1046	0	16742	399	8371	199	2093	50	25
2028-29 8 cases/list	7324	916	0	14649	349	7324	174	1831	44	22

The table below compares the following scenarios against an 8 patient hospital based pathway.

- 75% hospital based & 25% community based
- 50% hospital based & 50% community based
- 25% hospital based & 75% community based

x	Cataract requirement	Annual Surgical sessions	Community optometrist	Nurse (Hours annually)	Nurse (Hours weekly)	HCA (Hours annually)	HCA (Hours weekly)	Ophthalmologist annual sessions	Ophthalmologist weekly sessions	Ophthalmologist weekly theatre lists
2020 8 cases/list Hospital based	6495	812	0	12991	309	6495	155	1624	39	19.5
2020-21 25% community	6495	880	0	11434	272	5497	131	1539	37	18.5
2020-21 50% community	6495	947	474	9472	226	4263	101	1421	34	17
2020-21 75% community	6495	1015	761	7104	169	2791	66	1269	30	15

Real World Examples of pathways and theatre lists

The tables below show the timings of theatre lists on two consecutive weeks.

-
- Operating is due to start at 13.30 for 4 hours until 17.30
- All patients had attended a cataract assessment clinic prior to surgery and complex cases identified.
- An ST6 registrar also participated in both the assessment and theatre lists.
- All cases were under topical anaesthesia unless stated otherwise.
- The 'time taken' column is the time for the patient to arrive in the anaesthetic room from being sent for from the daycase unit, which in this unit is on a different floor.
- The 'into theatre' column is the time the patient entered the operating theatre prior to the patient being positioned and having their surgery.
- The 'out of theatre' column is the time the patient left the theatre following surgery.
- As can be seen, there is a mixture of case complexity and the registrar performed half of the cases both weeks.
- Interestingly, the reception staff improved upon the time taken to bring the patient to theatre by an average of five minutes over the two week period. They felt more comfortable with the system in the second week.
- The average time in theatre was very similar on both occasions.
- Reflections of the cataract assessment clinic and theatre sessions by an ST6 trainee are shown in Appendix 7. It was felt 'this new set up allows better rapport between the trainee and patient and also increases the efficiency of the list, allowing more time for training. These are the benefits to me as the trainee but of course, there are other benefits to the patient and to the hospital.'

Week one

PATIENT	SENT FOR	TIME TAKEN	ANAESTHETIC ROOM	INTO THEATRE	OUT OF THEATRE	THEATRE TIME	SURGEON GRADE	COMPLEXITY
1	13.24	9	13.33	13.34	13.50	16	CONS	
2	13.36	14	13.50	13.52	14.21	29	SPR	
3	14.03	7	14.10	14.21	14.35	14	CONS	
4	14.22	18	14.40	14.42	15.06	24	SPR	
5	14.51	11	15.00	15.06	15.20	14	CONS	
6	15.16	18	15.34	15.35	15.57	22	SPR	
7	15.38	12	15.50	15.58	16.20	22	CONS	Dense, vision blue used
8	16.05	10	16.15	16.24	16.42	18	SPR	
	Mean	12.3			Mean	19.9		

Week 2

PATIENT	SENT FOR	TIME TAKEN	ANAESTHETIC ROOM	INTO THEATRE	OUT OF THEATRE	THEATRE TIME	SURGEON GRADE	COMPLEXITY
1	13.28	6	13.34	13.39	13.55	19	CONS	Small pupil
2	13.40	7	13.47	13.58	14.30	32	CONS	Sub-tenon, post ACG, malugan ring used
3	14.05	6	14.11	14.34	14.50	16	SPR	
4	14.36	10	14.46	15.00	15.15	15	SPR	Dense, vision blue used
5	15.03	8	15.11	15.20	15.40	20	CONS	
6	15.29	8	15.37	15.40	16.00	20	SPR	
7	15.46	8	15.54	16.02	16.25	23	CONS	
8	16.10	8	16.18	16.25	16.42	20	SPR	Dense, vision blue used
	Mean	7.62			Mean	20.62		

Conclusion

We have reviewed and considered different methods of predicting and meeting the demand for cataract surgery over the next 10 years.

We have been deliberately specific with regard to the pathways as this will be of use to clinicians as well as providers and commissioners looking to optimise provision of services for their local population. To do this we have drawn on the recent work of other groups on cataract surgical pathway development. (GIRFT. London Cataract pathway, RCOphth and UKISCRS guidance).

We have calculated the increasing demand for cataract surgery over the next 10 years.

The workforce calculator we have developed describes the number of theatre lists and staff required to provide these services over the next 10 years at local, regional, and national levels.

The workforce calculator also allows individual Ophthalmic units to plan capacity and staffing based upon population predictions.

We have adhered to the GIRFT recommendations of '30 minutes per case' and demonstrated how this is easily achievable whilst still providing the capacity to perform complex cases and train the surgeons and supporting staff of the future.

The CWGDG regard these GIRFT recommendations as a minimum and have demonstrated that with careful design and implementation of the surgical pathway and training of an

appropriately staffed multidisciplinary team substantially more cases can be performed safely in a clinically and cost effective sustainable manner.

These recommendations if implemented widely will provide the capacity to meet the demand for cataract surgery to deliver a consistently high quality accessible service across the UK.

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7 Governance

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Details of the sources of any funding

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Details of the external peer-reviewers/stakeholder consultation

Cataract workforce guidance consultation webinar: 18.00 – 19.30 10 December 2020

This free webinar is aimed at inviting views on the latest cataract workforce guidance from The Royal College of Ophthalmologists. To register please go to

https://us02web.zoom.us/meeting/register/tZ0qcO2prD0jGd3gKDghYsgmYEtEOE_NjW5y

Membership of the Guideline Development Group

Name	Organisation
Mayank Nanavaty	Consultant Ophthalmologist, Sussex Eye Hospital and Representing the UK and Ireland Society of Cataract and Refractive Surgeons
Lawrence Gnanaraj	Consultant Ophthalmology and Clinical Lead, Sunderland Eye Infirmary
Jonathan Bhargava	GDG Chair and Consultant Ophthalmologist, Countess of Chester Hospital
Penelope Stanford	Senior Lecturer, Division of Nursing, Midwifery & Social Work, University of Manchester. Representing The Royal College of Nursing Ophthalmic Nursing Forum
Susan Blakeney	Clinical Adviser, the College of Optometrists (until 30/09/2020)
Sarah Cant	Director of Policy, College of Optometrists (from 30/09/2020)
Phil Ambler	Lay Representative, Thomas Pocklington Trust
Zuhair Mustafa	Representing the RCOphth Ophthalmologists in Training Group
Alexander Chiu	Clinical Fellow, The Royal College of Ophthalmologists
Barry Foot	British Ophthalmological Surveillance Unit and Guideline Manager, The Royal College of Ophthalmologists
Laura Coveney	Policy Researcher, The Royal College of Ophthalmologists
Declan Flanagan	Vice President, The Royal College of Ophthalmologists
Julie Silvestri	Consultant Ophthalmologist, Royal Victoria Hospital, Northern Ireland
Andrew Ferguson	Consultant Ophthalmologist, NHS Forth Valley, Scotland
Raghu Ram	Consultant Ophthalmologist, Royal Glamorgan Hospital
Zachariah Koshy	Consultant Ophthalmologist, Ayr Hospital
Beth Barnes	Head of Professional Support, The Royal College of Ophthalmologists

Conflicts of interest

The individuals involved in the development and formal peer review of this guidance were asked to complete a conflict of interest declaration. It is noted that declaring a conflict of interest does not imply that the individual has been influenced by his or her interest. It is intended to ensure interests (financial or otherwise) are transparent and to allow others to have knowledge of the interest. No conflicts of interest were declared by the group.

What is a cataract?

A cataract is a clouding, or opacity, of the lens inside the eye. Cataracts usually form slowly over a period of years, causing a gradual blurring of vision which eventually may not be correctable with glasses. In some people the vision can deteriorate quickly.

Developing cataracts can also cause glare, difficulty with night-time driving and multiple images in one eye, which can affect the quality of your vision.

There are two main options for managing cataracts

1. Using aids and adaptations to help you manage your vision
2. An operation to remove the cataract

Vision aids and adaptations

Vision aids are things you can use to help you see better for specific tasks such as glasses and magnifiers.

Adaptations are changes you can make to reduce the problems you have such as adjusting computer print size to make text appear bigger or changing your room lighting or using large print books.

These aids and adaptations do not treat the cataract but can help your sight. Your GP or optometrist can refer you to a low vision service who would be able to give you advice about aids and adaptations.

Cataract surgery

Cataract surgery is an operation to remove the cataract. The operation involves removing the cloudy lens and replacing it with a clear artificial lens.

In most cases surgery is very successful and most people who have a cataract operation can see better afterwards.

As with any operation, there are small risks. About 10% of people have some complication during or after cataract surgery and around 0.1% of people have worse vision afterwards.

Coronavirus Disease 2019

SARS-CoV-2 (COVID-19) is an important issue to consider when choosing whether to have cataract surgery or not. Opting to have an operation will involve at least one to two visits to the hospital, and to your optometrist, before, during and after surgery. Your individual risk profile for COVID-19 will be discussed at the time of deciding to have surgery and at pre-assessment. You may be asked to take a swab test for COVID-19. It may take a few days for a swab result to return. This is to protect the safety of you, other members of the public and staff. However, it is not possible to guarantee a zero risk of catching COVID-19 during any of your visits. You need to discuss and balance the theoretical small risk of contracting Covid-19 with the real risks to you of not treating the cataract. This may include issues such as reduced quality of life or inability to drive due to poor vision and varies with each individual.

How is your cataract affecting you?

Put a cross next to all items that apply to you

Because of your eyesight, have you had a problem with your ability to work?

Because of your eyesight, have you had a problem with driving?

Because of your eyesight, have you had a problem with your ability to undertake leisure activities such as reading, watching television or recognising faces?

Because of your eyesight have you had a problem with your mobility or do you feel that you are at risk of falls?

Because of your eyesight, are there other problems you are experiencing?

Please add details below:

.....

.....

Are you willing to explore using aids and adaptations to see better?

Are you willing to wait and see what happens to your vision?

Are you willing to have surgery that may make your vision worse or have side-effects?

Do you understand that there is a very small risk of COVID-19 if you attend for assessments and surgery for cataract?

Do you understand that delaying your operation until after the Covid pandemic is a reasonable alternative?



Appendix 2 Local Anaesthetic Coronavirus Cataract Proforma

Patient Label				Right / Left Phacoemulsification & IOL				LA	GA				
				Surgeon									
				TCI =				1 st		2nd			
				IOL Power		Right =		Left =					
				IOL Ordered				Yes		No			
Age =		Male / Female		Axial length >26mm		1.5	Axial Length <22mm		2				
Age 70-90		1.5		Glaucoma		1.5	Abnormal Cornea		2				
Age > 90		2.5		Absent Fundal View		1.5	Shallow AC		2				
Diabetic		Yes		No		Diabetic Retinopathy		1.5	PXF	3			
Poor Mobility / Positioning /unable to lie flat		1.5		Small Pupil		1.5	Only Eye		3				
Claustrophobia/Anxiety		2		Alpha Blocker		1.5	Mature / Brunescant		3				
Hard of hearing/limited English		2		Previous Trabeculectomy		1.5	Posterior polar		3				
Tremor		2		Previous Vitrectomy		2	PC rupture to other eye		3				
CL Wearer		Corneal laser											
VRE		Positive		Negative		Total: Trainee <3, Fellow, 3-6, Consultant only >6							
MRSA		Positive		Negative		Consent		Biometry					
Latex Allergy		Yes		No		Explained to patient – may require glasses post-operatively							
Drug Allergies		No		COMMENTS									
Warfarin		INR on Op day				Aspirin		Sub Tenon	Vision Blue	Healon GV	Iris hooks		
Pre/Post-op Advice		COVID Swab		Dentures		Recent falls		G. Proxymetacaine (as PGD)		Both Eyes			
Medical History		MI		CVA		Other		G Iodine 5% (as PGD)		Left	Right		
								Date	Time	Given By	Sign		
ICD													
BP			Temp			Pulse			BM				
Carer and transport Details													
1 SLOT (10 MINS)		2 SLOTS (20 MINS)			3 SLOTS (30 MINS)			1 SLOT (10 MINS)		2 SLOTS (20 MINS)		3 SLOTS (30 MINS)	
Assessing Nurse				Date				Name of Listing Dr / Nurse			Date		

Presenting complaint:

History of presenting complaint:

Past Ophthalmic history:

Refraction:

Family history:

Examination:

Plan: left right cataract extraction and lens implant under local anaesthetic

Risks, benefits, alternatives discussed with patient

1:1000 risk of blindness, 1% risk of capsular rupture

Risk of needing distance glasses due to refractive surprise

Risk of COVID-19 due to exposure in hospital environment

Appendix 3 Preoperative eye drops instructions for patients

Dear

Please attend for your eye cataract surgery at on
.....

In preparation for your cataract surgery please put at least 2 of the
provided drops into your eye at on

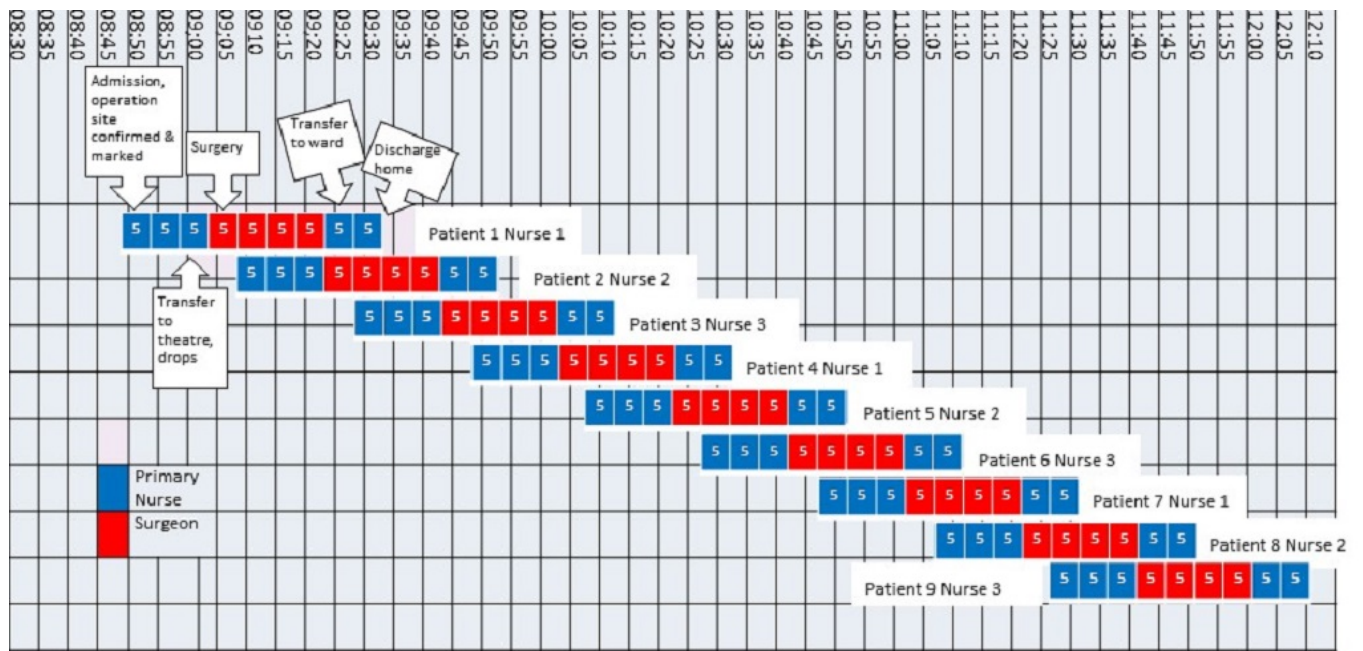
It does not matter if more drops go into your eye.

Appendix 4 Local Anaesthetic cataract theatre timeline

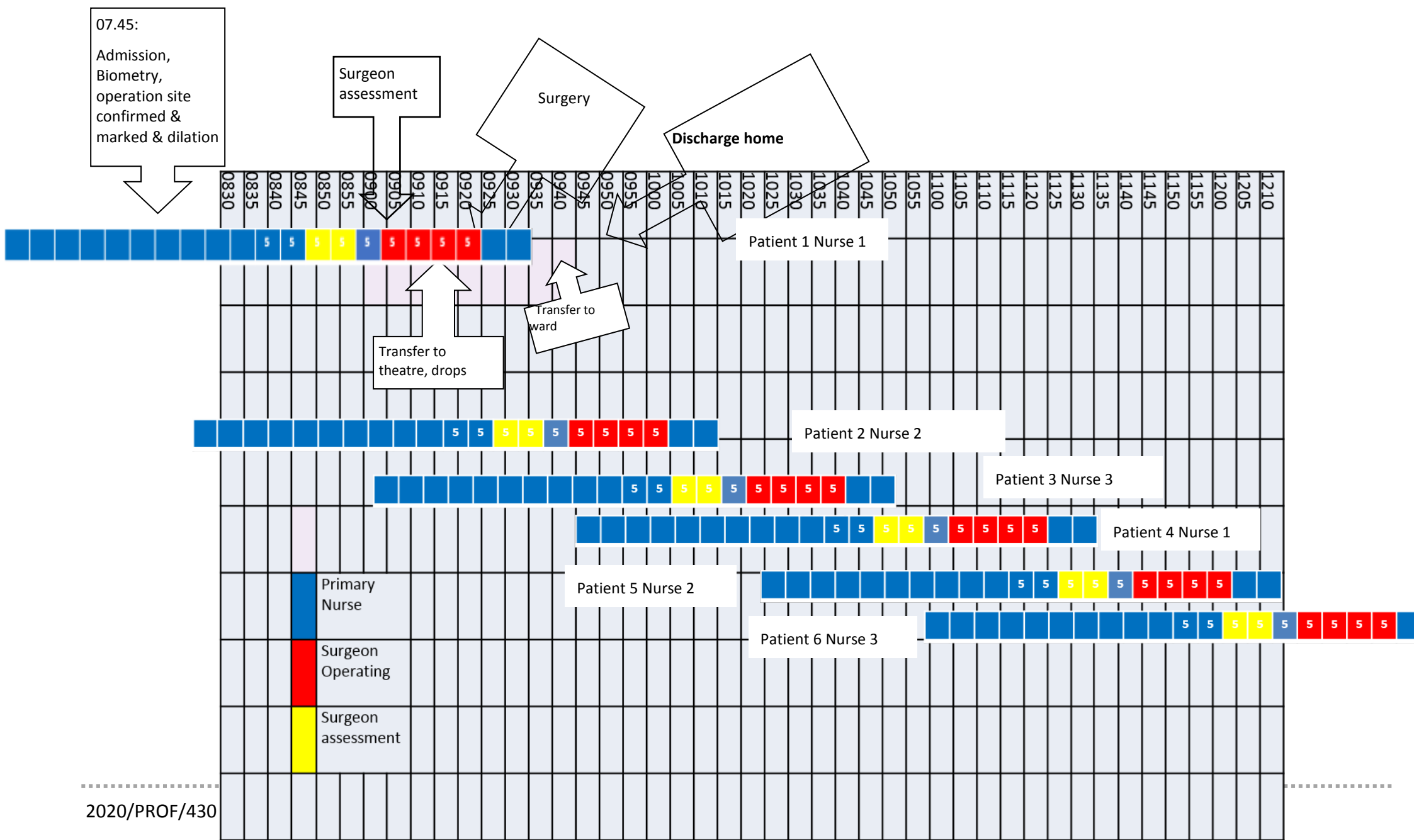
30 minutes surgical time

08.00	08.10	08.20	08.30	08.40	08.50	09.00	09.10	09.20	09.30	09.40	09.50	10.00	10.10	10.20	10.30	10.40	10.50	11.00	11.10	11.20	11.30	11.40	11.50	12.00	12.10	12.20														
	Blue	Blue	Red	Red	Red	Blue	Nurse 1 Patient 1																																	
				Blue	Blue	Red	Red	Red	Blue	Nurse 2 Patient 2																														
							Blue	Blue	Red	Red	Red	Blue	Nurse 1 Patient 3																											
										Blue	Blue	Red	Red	Red	Blue	Nurse 2 Patient 4																								
													Blue	Blue	Red	Red	Red	Blue	Nurse 1 Patient 5																					
																Blue	Blue	Red	Red	Red	Blue	Nurse 2 Patient 6																		
Red	Surgical time												Nurse 1 Patient 7										Blue	Blue	Red	Red	Red	Blue												
Blue	Nursing time												Nurse 2 Patient 8										Blue	Blue	Red	Red	Red													

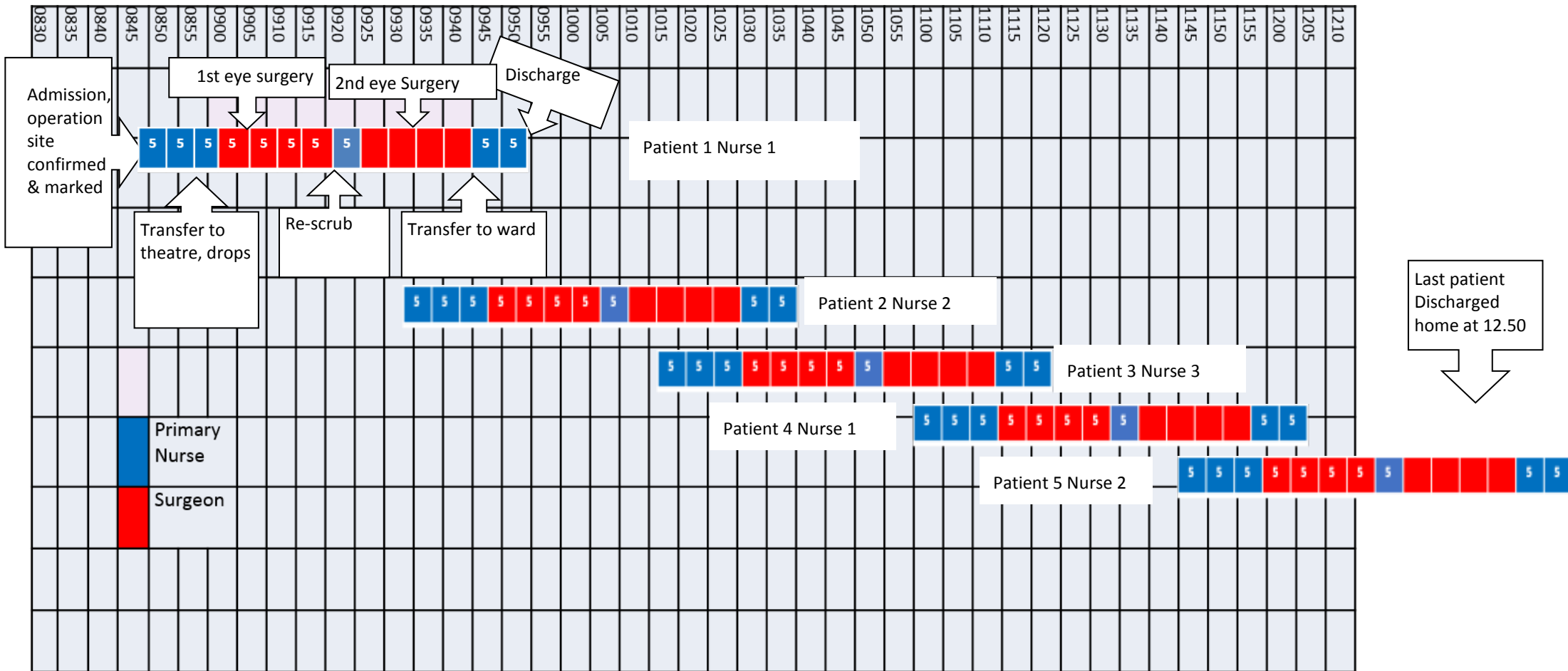
20 minutes surgical time



Appendix 5 Community based cataract theatre timeline (6 eyes 6 patients)



Appendix 6 Hospital based sequential bilateral cataract surgery theatre timeline – 20 minutes surgical time



Appendix 7 A trainee's perspective on cataract clinic and theatre

I am an Ophthalmology trainee ST6 in a hospital which runs a one stop cataract clinic, in which the patient has biometry and assessment by the operating consultant surgeon followed by surgery on an agreed date usually within 2-3 weeks. I undertake this clinic and list under the supervision of the consultant.

As a trainee, it can sometimes be difficult operating on a patient that you have never met before, either in clinic or during the pre-operative assessment. This often happens as trainees rotate regularly so patients you see and list often have surgery after you have moved to the next phase of your training. This frequently limits the rapport that can be developed between the trainee and the patient.

However, the short surgical pathway in my current hospital means that you meet the patient at the pre-operative assessment and the patient has surgery within 2 – 3 weeks. This means a rapport between the trainee and patient can be built prior to the day of surgery increasing confidence while reducing anxiety for both patient and trainee.

Furthermore, as you have met the patient recently and have created your own management plan for the operation so the day of surgery becomes much more efficient. Rather than needing to do a full pre-operative assessment on the day you meet the patient again in the anaesthetic room for the usual WHO checks. This means there is more time for operating. This maximises the time available to the trainee to operate under supervision.

The current arrangement I have with the supervising consultant is that we operate on alternate cases. The consultant operates while I perform the first stages of the WHO checklist with the next patient in the anaesthetic room and then scrub for that case. This increases the efficiency and number of cases on the list. I think this works well as I am able to operate independently as an ST6. However, even for a more junior trainee that needs more supervision, because the pathway is much more efficient, it still allows more surgical time for training junior trainees while still allowing them to meet the patient beforehand.

In summary, I think this new surgical pathway where I currently work allows better rapport between the trainee and patient and also increases the efficiency of the list, allowing more time for training. There are the benefits to me as the trainee but of course, there are other benefits to the patient and to the hospital.