Ophthalmology Diagnostic Hub Case study : University Hospitals Bristol and Weston (UHBW) NHS Foundation Trust

Background for the local service

- UHBW serves a local population of over 1 million and in addition takes regional referrals for subspeciality work.
- Bristol Eye Hospital (BEH) has been providing outpatient services across multiple sites in a 'hub and spoke' model for many years. Prior to COVID, outreach BEH services already extended to South Bristol Community Hospital, Weston General Hospital and a mobile treatment unit based at Cribbs Causeway shopping centre.
- Ophthalmology has the largest single-specialty outpatient footfall in the UHBW Trust, with approximately 115,000 clinic attendances annually, plus additional non-clinician patient visits for diagnostics and imaging.
- Bristol Eye Hospital has run virtual clinics for many years, utilising digital imaging and electronic patient record (EPR). There are also some existing shared-care schemes with local optometrists, such as for post-operative cataract follow-up as well as the management of ocular hypertension.

COVID

- When the COVID-19 pandemic struck in mid-March 2020, BEH had to cease all clinical patient activity across all ophthalmic sub-specialties other than emergency & urgent cases.
- Clinicians reviewed notes for all patients with deferred appointments to identify those who still needed to be seen urgently, and delivered significant number of telephone and video appointments to partially mitigate the impact on routine appointments. Remote appointments had limited use in some of the core work without the crucial diagnostic investigations.
- BEH identified that the highest risk of patients coming to harm in the form of sight loss or blindness related to COVID was in the outpatient group. Whilst patients were risk-stratified by BEH sub-specialty teams, the longer that outpatient appointments are deferred, the higher the risk of patients sustaining irreversible sight loss. Unfortunately, without obtaining further imaging it was not possible to further predict which patients were at particular risk. The numbers of cases delayed were quantified by subspeciality.

- When routine outpatient work did recommence, the social distancing requirements meant that the capacity for face to face outpatient work was around 50% of the pre-COVID capacity. The various mitigation strategies, such as telephone/video consultations and increased working sessions (evenings and weekends), were insufficient to deal with the COVID backlogs, and the capacity was already fully utilised within BEH as well as all of the outreach sites for ophthalmology.

Initial steps and planning

Having identified and quantified the delays to follow-up, proposals were made to address this.

a) Development of an imaging hub to see high volumes of patients off-site. A pilot of this was undertaken in the first instance using space at a local private hospital (made available as part of the COVID plans), coupled with increased weekend diagnostics-only clinics on site, pending approval and roll out of the imaging hub.
b) Joint working with the community optometrists to develop enhanced models of care in the community. Discussions with the local optometrists showed that the scale of the backlogs would require a two-pronged approach, with both an imaging hub co-ordinated by the trust as well as gradually upscaling the community optometric work as a medium to longer term model. The optometric model would also require work to deal with imaging connectivity issues. The community optometric model is not addressed further in this document although work is ongoing in this regard, with a bid going into NHSX via South West region for funding related to IT connectivity.

Implementation decisions for the imaging hub

- Finding a suitable location. Local empty retail facilities were explored along with the local Nightingale hospital which was not being used for COVID patients.
- Early Involvement of the IT team, especially to deal with imaging connectivity and information governance aspects. The images taken at the imaging hub are then viewed at computers within the UHBW server network (desktops and UHBW laptops off site).
- Decisions about subspeciality involvement and the types of patients to be seen. Decisions were based on the subspecialities with the largest backlog and greatest clinical risk.

- A decision was made to pursue imaging streams for follow-up patients with chronic stable glaucoma, medical retina conditions and one stream for keratoconus patients.
- Design of the imaging requirements/patient flow:
    - Glaucoma stream: short questionnaire, visual acuity (VA) (minilogMAR), IOP, dilate, disc/macula OCT, Humphrey visual fields (HVF).
    - Medical retina streams: VA (minilogMAR), dilate, widefield colour fundus photographs, autofluoresence, plus spectral domain OCT for all patients. The pathway was not specific to one diagnosis, although diabetic retinopathy makes up the largest proportion. IOP is measured for certain patients eg proliferative diabetic retinopathy (PDR), central retinal vein occlusion (CRVO)
    - Keratoconus pathway. Questionnaire, latest refraction data from local optometrist, plus anterior segment OCT (MS39) imaging
- Funding approval: via COVID recovery funding streams. First divisional then trust executive approval, then to regional committees for approval.
- Multiple separate streams for glaucoma (4) and medical retina (3) were deemed necessary to deal with the COVID backlogs, plus 1 stream (2 days per week) for corneal work.
- Based on social distancing and the need to clean equipment between patients, a decision was made that it was practical to image 18 medical retina patients per stream per session, and 11 glaucoma patients per stream per session.
- Standard operating procedures were created for the glaucoma and medical retina teams about the specifics of the grading/EPR process, and how to provide clinical outcomes to administrative staff to input our Medway PAS bookings system.
- Clinical guidelines were also been written for the various medical retinal conditions, taking into account the requirements of the COVID recovery phase. For medical retina, cases were booked in from our existing ‘virtual clinic’ patient lists, as well as other cases who were deemed suitable for virtual clinics after a complete review of the medical retina pending list that took place during the first lockdown. In addition to this, some patients who were cancelled during the first lockdown were seen in virtual clinics in order to get them seen in a timely manner. We found a higher proportion of those also needed telephone consultations after the virtual review due to the case mix.

Equipment requirements

Stream	Number of streams	Equipment requirements
Medical Retina	3	3 wide angle cameras (OPTOS); 3 OCTs (Topcon Triton) (one imaging technician would scan the same patient on both OPTOS and OCT); 1 iCare tonometer (covering all streams) MinilogMAR Visual acuity charts
Glaucoma	4	4 iCare tonometers,4 HVF,4 OCTs (Topcon Maestro), MinilogMAR Visual acuity charts
Cornea	1	1 MS39 Anterior segment OCT

Laptops were required for remote image reviews/grading. The current grading suite at BEH had insufficient space with social distancing to allow for enough grading capacity so the purchase of laptops was recommended to allow flexible locations for work. There were also additional equipment /IT costs:

- Annual maintenance costs for equipment = £43,872
- Consumables £52k
- Medway PAS licence costs for a new site: £10k.

COVID infection control measures/PPE: These are the same as for the BEH ophthalmology service. The huge space at the Nightingale hospital means that there are no particular issues with adhering to social distancing.

Staffing

Leadership

The key to the success of this roll out was having a truly outstanding project manager (Jan Belcher). In the initial stages of the work, she dedicated 1-2 days per week to this, which rose gradually to 4 days per week as the bid was approved and the service development began. In addition, at different phases of the roll out, significant management and leadership contributions

were needed from other existing members of staff, e.g. nursing lead, imaging leads as well as consultant input for the relevant subspeciality services.

Admin

Administrative support was required to process the appointments/ posting letters etc. as well as operational oversight.

Imaging and assessment

Whilst some of the staffing used were reallocated from the existing workforce, partly possible due to reduced footfall due to social distancing at BEH, additional roles in the business case bid were: 1 WTE band 3; 1WTE band 2; 1WTE band 6 (fixed term, to deal with operational management, patient safety and staff management).

The table below shows the staffing levels/banding overall for each of the streams for clinical data acquisition:

Stream	Number of streams required	Role / Tasks	Staff per session	Hours per session to cover clinic	Days per week	Band
Medical Retina	3	Imaging Tech Colour Images and OCT (1 band 5 problem solver senior support with 2x band 4)	1	9 hours	5	5
			2	9 hours	5	4
		Visual Acuity, IOP, dilate - eye drops	3	9 hours	5	3
Glaucoma	4	OCT and questionnaire IOP and VA	4	9 hours	5	4

		Fields	4	9 hours	5	3
		Support role to enable streams to flow	1	9 hours	5	3
Cornea	1	MS39 image x3 Record refraction info provided by community optometrist via patient	1	9 hours	2	4

Appointment and training of the new members of staff were key to success in a timely manner. We utilised the UCL technician online training modules for new staff as well, in addition to local training. The cost of staff training was £6k.

Grading and post review actions

- The bulk of the grading workforce have come from existing staffing/ job plan modifications.
- 0.5 WTE additional optometry time was put into the bid.
- The primary grading is done by trained extended role optometrists who are employed by UHBW, band 8a.
- For medical retina, some primary imaging sessions are also undertaken by consultants, with additional consultant sessions to deal with clinical queries or teleconsultation arising from the primary grading. Any case who might need laser treatment or anti-VEGF treatment will have a teleconsultation with a medical retina consultant, who will discuss the risks and benefits of treatment with the patient. They will then be listed for treatment as appropriate and sign the consent form on their day of treatment. New consultant

sessions were not included in the request for funding, these were managed by alterations to existing job plans.

- Telephone consultations with consultants are arranged for certain patients depending on the findings at primary grading. These teleconsultations are booked up in designated slots, allowing 20 minutes between cases to allow for case review/ discussion with patient/ EPR completion and listing if required.

Grading/post grading timelines

- Grading is generally undertaken with 24 hours of imaging session (formal timetabled sessions with specific individuals allocated to specific imaging session). Cross-cover for leave is included.
- The administrative team then do the final outcome on our Medway bookings system and are aware from timetable of when the grading should have been done.
- Patients receive their feedback letter within a maximum of 2 weeks after the imaging appointment.
- Failsafe is included in the management roles for the project and with administrative governance managed through the PAS system.

Patient factors

- Patients receive specific information about the Nightingale service and location when they are given their appointment.
- Parking at the location is easy for both staff and patients/carers.
- A link bus to the local transport hub has been provided by the trust to take patients to and from the Nightingale, running throughout the day.
- A patient satisfaction questionnaire has been designed and larger scale feedback will be reported in due course. Initial feedback from the pilot location and from the Nightingale has been very positive.
- Local media work to highlight the new service and to reassure around the safety of the appointment.

- GP letters are sent electronically.
- Patients receive a posted version of a specific letter written to them with their results in lay language, as well as a copy of the letter sent to the GP.
- ECLO support remains available via the BEH team for these patients.
- Patient communications cost £5k for the start up of the service.

Clinical governance aspects

As this is an outreach location for our trust ophthalmology services, the same clinical governance aspects/Datix reporting apply.

There are protocols for cases requiring urgent review to attend our ophthalmic A and E department (such as IOP >35mm Hg).

Benefits and results

- Significant increase in capacity to see follow-up patients, allowing COVID backlogs to be reduced. Alternative location(s) would need to be found once the Nightingale is no longer available, but the modular approach means that this can be broken down into smaller units of imaging work as needed.

  Once all streams are running fully there would be capacity to see approx. 1000 patients per week. The final streams have been delayed slightly due to COVID pressures in the rest of the trust necessitating ophthalmic staff transferring to help the medical teams. Currently 2 medical retina streams, and 3 glaucoma streams are operational 5 days per week, with a 4th glaucoma stream starting in February 2021.
- Shorter clinic visit times
- Larger space, easier for social distancing.

Key learnings

- Having an excellent project manager is vital to success.

- Multidisciplinary team approach. Weekly imaging hub meetings for the whole group, with subgroup meetings to move forward particular aspects.
- Bookings support and post-visit administration should not be underestimated. Given the COVID pandemic, trying to maximise patient attendance is vital and time-consuming. Without this, DNA rates may be high
- Appropriate time should be allocated for staffing recruitment and training (29 new members of staff were appointed and trained in a short time for this imaging hub work)
- IT connectivity and networking must be tested in location. Despite significant input in advance, this still required attention during scale-up of streams, and accessible IT support is desirable.
- Staff enjoy the refreshing challenge of something new and by including a wide multidisciplinary team, greater ownership is achieved and greater impact at pace.

Images of medical retina streams

Imaging area

Dilatation waiting area

Vision and dilate pod

Overview of one MR stream

Pre-appointment waiting area

View of all 3 MR streams

Images of the glaucoma streams

Visual field testing

VA and OCT testing