

The flexibility of virtual clinics



Figure 1: The virtual Drive-Through IOP queue.

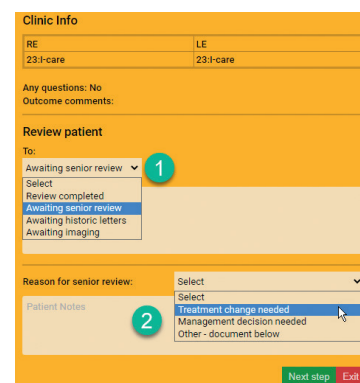


Figure 2: The EPR used for virtual review.

Virtual clinics in ophthalmology are typically associated with glaucoma and medical retina, where they are now a well-established part of the landscape. The availability of an ophthalmic electronic patient record (EPR) makes the deployment and management of virtual clinics much easier. Once equipped with software of this nature, we have found that the virtual clinic model can be effectively applied to many other environments not previously considered suitable. We started using a virtual clinic model in oculoplastics at my workplace (in addition to our existing glaucoma and retinal models) back in 2018. More recently, in the context of removing paper-based pathways and due to the pressures of COVID-19, we have found several further uses of virtual clinics that may make you consider a wider role for this approach.

In addition to glaucoma and retina, we have virtual clinic processes in the following areas:

- Oculoplastics (for the imaging of eyelid pathology by a photographer, with virtual clinician review)
- Keratoconus (for topographic imaging with subsequent virtual review)
- Fundus fluorescein angiography (FFA) and indocyanine green (ICG) pathways (virtual clinic pathway to track patients from booking to review of results)
- Drive-through intraocular pressure (IOP) monitoring (used to help manage the COVID-19 related glaucoma backlog).

The need for the drive-through IOP virtual clinic has lessened, given the reduction in COVID-19 related restrictions. Nonetheless, this service provides an interesting example of a virtualised workflow, which could easily be modified to suit other needs. We deployed a drive-through IOP service in our area during the lockdown period. We were inspired by the drive-through service put in place by Belfast Health and Social Care Trust. Our technicians sheltered under a marquee, set

up in Bolton University car park. Patients arrived by appointment and had their IOPs measured, whilst still in their vehicle, using an iCare device. The IOPs, and any questions, were entered directly into our Drive-Through Virtual Queue in our ophthalmic EPR on a battery powered laptop. Internet connectivity was provided by a 4G mobile broadband device. The cases were then reviewed by an allied health professional (AHP) in our glaucoma team, working from home. A diagram of the virtual queue, showing the route the patients could follow, is reproduced in Figure 1.

The diagram shows the possible states that patients can reside in, while in the Drive-Through IOP queue. The pathway allows for virtual review, requesting senior review, requesting historical data be added to the electronic record from the paper notes and requesting the patient be brought into the unit for imaging. A further option of senior review is then possible, if needed. Figure 2 shows the software panel where the reviewer can choose the outcome (1), and further questions, depending on the choice (2). The screenshot is from the EPR used in my workplace (OpenEyes), but virtual clinic support is also provided by Medisoft.

Virtual pathways are perfect for processes that run over multiple sites (like this one) as there is no need to manually transfer any paper forms or notes between the sites. Most virtual pathways use a simple two or three state approach, where the patient is placed into an 'awaiting review' state. Following review, the patient moves to a 'review complete' state. The beauty of the virtual model is that complex pathways, with decisions that alter the subsequent route (like requesting senior review), are also supported. Our FFA/ICG retinal angiography pathway incorporates a similar branching pathway to support patients who are listed from virtual review (not present in the department) versus

those who are, and have observations taken before leaving. Individuals who are found not fit for angiography may need to exit the virtual queue at several points, again using branching options. Virtual pathways like this have a significant strength of tracking patients through all steps, thus reducing the risk of aspects being missed. In addition to supporting the move away from paper documentation, we chose to move to a virtual pathway for retinal angiography to reduce the risk of the investigation results not being seen or acted on. Many clinical pathways carry similar risks, and failsafe procedures are generally desirable.

Once a virtual pathway has been designed and built into an EPR, the pathway becomes relatively rigid, as patients follow predefined routes through the system. This rigidity contributes to the safety of the pathway, but it does mean careful design is needed. We have found that including staff involved in the pathway to help design and test the virtual steps is especially important to build an accurate virtual model of the process.

The use of robust virtual queuing systems provides a flexible approach to add this type of assurance and may have more suitable applications than first considered.

SECTION EDITOR



David Haider,

Consultant Ophthalmologist and Chief Clinical Information Officer, Bolton Foundation Trust, UK.

E: david.haider@nhs.net
Twitter: [@drDavidHaider](https://twitter.com/drDavidHaider)

Declaration of competing interests: The author assists in the design and strategic direction of the OpenEyes Electronic Patient Record. This is a non-remunerated role.