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Health economics of virtual versus face-to-face glaucoma clinics: a time-driven activity-based costing study

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ABSTRACT

Background/Aims Staffing represents the most significant cost to the National Health Service, and ophthalmology is its largest outpatient specialty. Value-based healthcare (VBH) focuses on care processes. Innovative models include a shift towards 'virtual' glaucoma services. We used VBH costing methodology to quantify personnel costs of virtual and face-to-face (F2F) glaucoma clinics.

Methods Virtual and F2F clinics were process-mapped to produce step-by-step pathways of patients in each setting. Real-world timings were then audited, and time-driven activity-based costing was used to calculate the personnel cost-per-patient for both settings.

Results Data were captured from 24 consecutive virtual glaucoma patients and 42 consecutive patients across two F2F clinics. The capacity cost rates in £/min were £0.24 for technicians and £1.16 for consultants. The average time taken to acquire clinical data in the virtual pathway was 39 min per patient (95% CI 36 to 43, range 27–61) with 14 min (95% CI 13 to 14, range 12–20) for their remote consultant review. The estimated personnel costs associated with a single virtual glaucoma clinic visit totalled £25.60 (95% CI £23.72 to £33.52). The average time taken to be seen in the F2F clinic was 50 min (95% CI 42 to 59 min, range 12–123 min) with a personnel cost of £31.08 (95% CI £19.70-£42.43).

Conclusion Staff costs associated with visits to the consultant-delivered virtual and F2F glaucoma clinics were similar (p value=0.14), supporting virtual clinics to provide service capacity. The main limitations were that our study involved a single site, small sample size and did not consider the severity of glaucoma.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ The costs of glaucoma care using 'top-down' methodology that rely on reference costs such as national tariffs, as opposed to costs captured at the patient-level, are available in the published literature.

WHAT THIS STUDY ADDS

⇒ Time-driven activity-based costing is a methodology that is able to capture personnel costs incurred by interactions at every step of the patient pathway. In this way, novel insights are presented for such costs in the context of real-world virtual and face-to-face glaucoma clinics.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Healthcare providers can use this methodology to analyse their own personnel costs locally and use the results to guide decisions on staffing and thus influence existing and future service delivery models.

INTRODUCTION

The concept of value-based healthcare (VBH) defines value for the patient as condition-specific results that matter most to patients divided by the cost of delivering these outcomes.[1] This differs to the concept of cost-effectiveness used by the National Institute for Health and Care Excellence (NICE) which considers specific metrics, such as cost per quality-adjusted life-year gained. and is used by the National Health Service (NHS).[2] In essence, VBH is focused on processes and cost-effectiveness analysis is focused on outcomes. In the UK, the NHS employs 1.5 million people.[3] In 2021/2022, staff costs totalled £66.2 billion, which amounts to 45.2% of the NHS budget.[4–6] However, the way these costs relate to the various activities undertaken to deliver specialist services within the NHS is not well understood.[7]

The 'capacity cost rate' is an index used by VBH to calculate the cost per minute for a particular team member's time in a particular clinical activity. It is calculated using a team member's annual salary coupled with their working pattern to establish clinical minutes available per year. Time-driven activity-based costing (TDABC) is able to quantify personnel cost by combining real-world time data with the capacity cost rates of involved staff, when healthcare is delivered by a multidisciplinary team (MDT) in a series of highly predictable steps for a condition-specific outcome. This model is referred to as an 'Integrated Practice Unit' (IPU), and the use of TDABC in such settings is able to factor in the various members of staff involved to arrive at an overall personnel cost for this activity.

Examples of TDABC applied to ophthalmic services are present in the literature. For example, in an AMD intravitreal injection clinic in Sofia, Bulgaria, Dacheva and colleagues were able to use TDABC to better understand their current staffing arrangements and apply this model to optimise workforce capacity.[8]

Image acquisition in virtual and face-to-face (F2F) glaucoma clinics are both comprised of an MDT that come together to provide highly predictable steps, many of which are repeated for each patient to complete their cycle of care. In this way, they can be considered to be IPU) for the purposes of a costing exercise.

The UK public healthcare landscape is moving away from Reference Costs that relied on historic averages to Patient-Level Information and Costing Systems (PLICS) in an effort to combine the fixed prices paid for particular services with real-world activity data.[9] PLICS traces the resources used by individual patients in their diagnosis and treatments to derive the costs incurred by the organisation in providing their care.[10] Nevertheless, this does not capture every step of the patient's journey and hence falls short of a comprehensive reflection of total cost.

With over 5.5 million attendance episodes recorded in 2020–2021, ophthalmology is the largest outpatient specialty in the UK.[11] The greatest proportion of activity arises from cataract, glaucoma and medical retina subspecialist services.[12] Glaucoma, diabetes and age-related macular degeneration are each chronic life-long conditions that usually burden the patient with ongoing hospital eye services visits from the point of diagnosis. Treatment strategies currently revolve around halting disease progression or limiting the functional impact of disease.

With age being a primary irreversible risk factor for primary open-angle glaucoma and AMD, a close consideration of population demographics is prudent. The Office for National Statistics (ONS) put the number of people in England aged 85 years and over in 2018 at 1.6 million, and this is projected to almost double to 3 million by 2043.[13] Given this ageing population, it is predicted that the demand for these services will continue to grow. For example, Chopra *et al* recently found that the number of intravitreal injections administered at a large London eye hospital increased 11-fold from 2009 to 2019, with almost 83 000 predicted in 2029.[14]

The realisation that patients' attendance time should not be excessive, and consultant-contact time must be reserved for those who most need it, has led to several innovative solutions in how providers deliver services. For glaucoma, this has manifested in a paradigm shift towards streamlined 'virtual' clinic services. Patients are invited in for data and image acquisition in the form of standardised short medical histories, identifying risk factors, coupled with initial assessments including visual acuity, followed by a host of imaging and functional tests, after which they leave, removing the rate-limiting step of the need to see their clinician and hence resulting in much shorter visit times. Clinicians are then able to remotely review the acquired data and use them to base their clinical decision-making. At a large London eye hospital, such virtual clinics with asynchronous reviews were found to provide an efficient way to keep patients within their medical retina service away from F2F clinics with finite capacity.[15]

In addition, these virtual clinics can be used for referral refinement. For example, Gale *et al* recommend routine use of optical coherence tomography (OCT) as a second-line screening tool for those identified as having diabetic maculopathy by diabetic eye screening services[16] and to monitor stable patients that, having been seen in traditional F2F clinics, are deemed low risk.

The aim of this study was to use TDABC to estimate the personnel cost per patient for a typical virtual and F2F glaucoma clinic, using the principles of IPUs and VBH.[1] In doing so, we can provide insight into real-world implications, such as how many patients can be processed per unit cost.

MATERIALS AND METHODS

The study is characterised as a cohort analysis with prospective collection of real-world time data followed by cost analysis using TDABC. A total of 66 patients were included in the study. Inclusion criteria consisted of all patients that attended one new patient virtual clinic containing 24 patients and two F2F clinics consisting of a further 42 patients on predefined dates based on staff availability. No patients attending on any of the three dates were excluded from analysis. Analysis was conducted using a two-tailed student's t test with an alpha of 0.05.

The two F2F clinics comprised of one with a diagnostic and medical management focus, such as patients entirely new to the clinic without an established diagnosis of glaucoma, and those with a diagnosis, attending for further management decision-making. The other had a focus on postoperative surgical cases, namely patients that had undergone recent filtration surgery. Together, the two F2F clinics were thus required to provide a representative sample of the patients seen in the F2F setting. Scoping meetings were held with key glaucoma team members, allowing us to process map the patient journeys for each clinic (figures 1 and 2). The decision for whether or not a particular patient underwent diagnostic tests in the F2F clinic was predetermined by review of the clinic list ahead of the clinic start time by either the orthoptist or fellow, based on clinical need guided by brief review of the electronic medical records. This took place in an ad hoc manner outside of clinic time and hence was not factored into the process map.

Each visit to the F2F clinic incurred a further personnel cost associated with senior consultant review to guide decision-making for each of the patients initially seen by either a fellow or orthoptist. The scoping exercise

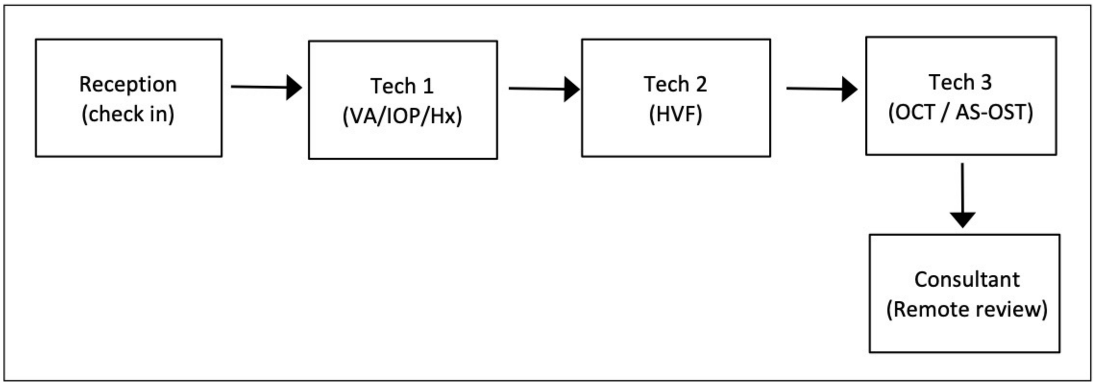

Figure 1 Virtual clinic process map. AS-OCT, anterior segment and angle OCT; Hx, history; HVF, Humphrey visual field; IOP, intraocular pressure; OCT, optical coherence tomography; Tech, technician; VA, visual acuity.

enabled us to quantify this to be 4–8 min of consultant time for discussion with the orthoptist and 3–6 min for the fellow. As such, for the purposes of costing, 6 and 4 additional consultant minutes were added to each orthoptist and fellow visit, respectively. The F2F clinic made use of the 'Intouch with Health' (VitalHub UK Ltd., London, UK) patient journey platform.[17] This software allows clinicians to electronically 'call' the patient from the waiting or imaging area when they are ready to be seen and then 'discharge' them on completion of the consultation. Each action is time-stamped; thus, electronic capture of the time spent with each member of staff was made possible.

The new patient virtual clinic was comprised entirely of patients that had been newly referred to the glaucoma service, both internally, such as from other subspecialty clinics and the emergency 'rapid assessment unit', and externally, such as from the community. Times were recorded for each patient in real time using digital stopwatches and paper data collection forms to record the start and finish times of each process step. In order to capture the entire pathway, the subsequent remote reviews of these patients were also timed.

The capacity cost rate was calculated for members of staff using figures based on the standard NHS contract for the medical[18] and non-medical workforce.[19] The following assumptions were made for simplicity: technicians have the annual leave entitlement given to those with less than 5 years of service, while the consultants, fellows and orthoptists had leave entitlement of those with greater than 5 years of service. Technicians and orthoptists work a 37.5-hour week, while consultants and fellows are contracted to work 40 hours. Technicians were band 3 and received a high-cost area supplement based on the clinic location (Sidcup, Kent), while orthoptists were band 7. On-call allowances for consultants

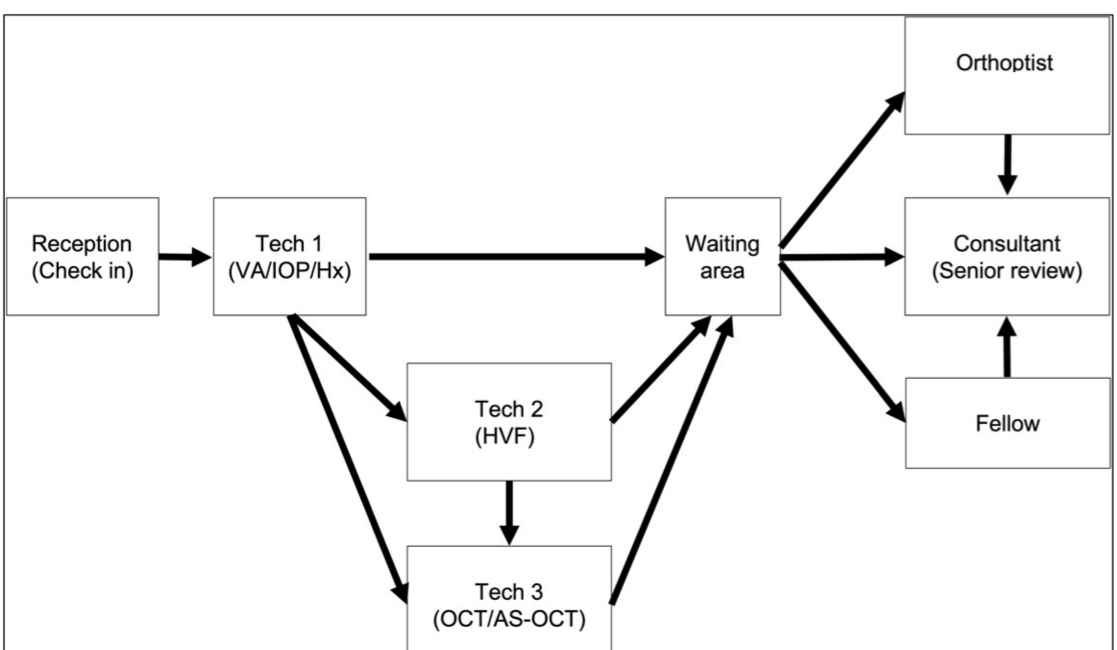

Figure 2 Face-to-face clinic process map. AS-OCT, anterior segment and angle OCT; Hx, history; HVF, Humphrey visual field; IOP, intraocular pressure; OCT, optical coherence tomography; Tech, technician; VA, visual acuity.

Table 1 Capacity cost rates

Resource	Technician	Consultant	Fellow	Orthoptist
Weeks per year	52	52	52	52
Less: vacation and holidays	3.86	4.57	4.57	4.57
Less: training and leave	0.00	2.00	1.00	0.00
Available weeks per year	48.14	45.43	46.43	47.43
Hours per day	7.50	8.00	8.00	7.50
Less: breaks, training, meetings	0.00	1.00	0.00	0.00
Available hours	7.50	7.00	8.00	7.50
Less: research/study/teaching/administration (%)	0.00	0.20	0.20	0.10
Clinical hours per day	7.50	5.60	6.40	6.75
Clinical minutes available per day	450.00	336.00	384.00	405.00
Clinical minutes available per year	108315.00	76322.40	89145.60	96045.75
Annual cost per person	£25675	£88364	£58398	£47672
Capacity cost rate (£ per minute)	£0.24	£1.16	£0.66	£0.50

and fellows were omitted. Consultants and fellows were assumed to have two half-day sessions a week of non-clinical time to cover non-clinical commitments, with an additional 1 hour a day for consultants. Orthoptists were assumed to have one half-day session of non-clinical time a week. Study leave was assumed at 2 weeks per year for consultants, 1 week for fellows and none for orthoptists and technicians. Sick leave considerations were omitted from all staff groups (table 1).

Finally, time-driven activity-based costing methodology was used to combine the capacity cost rates with the patient time spent with each team member, to generate a personnel cost per patient, for each pathway. For example, the first patient seen in the virtual clinic spent 11 min with the first technician, 13 min with the second and 10 min with the third followed by 14 min for the remote review of their clinical data. Cost was calculated by multiplying the time taken for each step with the relevant team member's capacity cost rate. So, for this patient, the total pathway was costed as follows: (11×0.24) + (13×0.24) + (10×0.24) + (14×1.16) = £24.40. In this way, representative personnel costs per patient in the virtual clinic were calculated by taking the mean time spent with each team member.

The same methodology was applied to the data captured in the F2F setting. For example, the first patient seen in the F2F clinic spent 7.5 min with the first technician; they did not spend any time in diagnostic tests; hence, no further time was spent with technicians, and they spent 11.5 min with the clinician. The consulting clinician was the consultant, so no further time needed to be added on. So, for this patient, the total pathway was costed as follows: (7.5×0.24) + (11.5×1.16) = £15.14. In this way again, representative personnel costs per patient in the F2F clinic were calculated by taking the mean time spent with each team member.

Overheads and implementation costs were omitted, as the same for both modalities.

Patients or the public were not involved in the design, conduct, reporting, or dissemination plans of our research.

RESULTS

Twenty-four patients attended the virtual clinic on the day of the costing exercise, with zero non-attendances. Case note review by the consultant confirmed that the sample was representative of the patients ordinarily reviewed in this setting. Timings encompassed identity checks, medical history taking, positioning the patient and saving the data acquired to the electronic medical record. The time taken to check in was routinely noted to be less than 1 min. Receptionist costs could reasonably be thought of as an overhead that was fixed in both virtual and F2F settings; hence, this was omitted from the costing calculations. The average time taken to acquire clinical data was 39 min (95% CI 36 to 43 min, range 27–61 min) per patient with 14 min (95% CI 13 to 14 min, range 12–20 min) for their remote consultant review. The estimated personnel costs associated with a single virtual glaucoma clinic visit involving three technicians and a senior remote review came to £25.60 (95% CI £23.72 to £33.52) as presented in table 2.

Forty-two patients attended the F2F clinic across two dates. The data captured relied on software that required manual input ('Intouch with Health' (VitalHub UK Ltd., London, UK)), resulting in the possible prospect of human error and therefore should be taken into consideration on reviewing the outliers. To limit their impact on our estimates, median values and interquartile ranges are presented alongside mean values and confidence intervals. Almost a third of patients (29%) in the F2F glaucoma clinic required OCT imaging lasting a median time of 6 min (IQR 5–9), while just over a fifth (21%) underwent visual field testing for a median time of 17 min (IQR 9–31). The median time spent in the consultation that followed was 21 min with the consultant (IQR 11–62),

Table 2 TDABC for the virtual pathway					
Resource	**Tech 1**	**Tech 2**	**Tech 3**	**Consultant**	**Total**
Mean personnel process times (minutes)	14	13	12	14	
Personnel cost per virtual clinic visit (£)	3.4	3.1	2.9	16.24	**£25.60**

TDABC, Time-driven activity-based costing; Tech, technician.

14 min with the fellow (IQR 10–34) and 21 min with the orthoptist (IQR 18–34). The estimated personnel costs, including up to three technicians and review thereafter by consultant, fellow or orthoptist, came to £17.69. Six and four additional consultant minutes were incurred by each orthoptist and fellow visit respectively. Once these are factored in, the estimated personnel costs using median data, amassed by a single visit to the F2F clinic, total £21.65 (IQR £15.18–41.46) (see online supplemental table). The mean figure is £31.08 (95% CI £19.70 to 42.43) as presented in table 3. Capacity cost rates and TDABC data are presented in table 1.

DISCUSSION

Staffing represents the most significant cost to the NHS. Ophthalmology is the UK's largest outpatient specialty, and therefore patient pathways and staff time must be managed efficiently. This study estimated the personnel costs associated with a standard virtual glaucoma clinic as £25.60 (95% CI £23.72 to £33.52), compared with £31.08 (95% CI £19.72 to 42.45) for a F2F clinic. A two-tailed student's t-test was performed comparing the total personnel costs per patient pathway between the virtual and F2F clinics, and this demonstrated no significance at the 0.05 level (p-value=0.14).

It may seem counter-intuitive that F2F and virtual costs were similar; however, there are several contributory factors to this. First, we relied on direct patient encounters alone. As such, for almost a third of the patients in the F2F clinics, we relied on an estimate of the time taken for consultant input to guide decision-making. In practice, these discussions may well be either longer or shorter than the estimated 4 and 6 min, hence introducing a degree of uncertainty. Moreover, the consultant may be preoccupied with an alternate patient consult, necessitating the fellow/orthoptist to wait until the respective consult is completed.

Second, the virtual clinic set-up encompasses all three technicians performing tasks for every patient. In contrast, not every patient seen in the F2F clinic requires all the diagnostic tests. Instead, of the 42 patients audited, over half were seen without the need for visual fields or OCT imaging, and this therefore reduces the personnel costs in such cases. For a more directly proportionate comparison, new patient clinics would be compared in both clinic settings.

Third, it is prudent to reiterate that the virtual pathway evaluated in this study was a new patient pathway, warranting consultant review, as per NICE guidance.[20] This would not necessarily be the case for risk-stratified stable patients who could be reviewed by non-medical workforce or junior doctors, as per guidance issued by the Royal College of Ophthalmologists (RCOphth)[21] building on the work of Kotecha *et al*.[22]

In the published literature, staff costs associated with F2F clinics have also been estimated using a top-down approach. Fu and colleagues set about determining the overall costs of glaucoma management in the clinic setting, in a retrospective cohort study that included over 40 000 patients and spanned 2013–2018.[23] Using 2016 as an illustrative example, medical staff costs alone were calculated to be £209 per patient for 12 months of NHS-provided glaucoma care. This relied on the use of unit costs per encounter based on the UK national tariff for 2019–2020. Interestingly, NHS reference costs for 2021/22 lists the unit cost of a single consultant-led clinic appointment as £147.[24] This work provides a useful insight and is a logical approach to navigate the complex costing of the NHS. However, as previously discussed, national tariffs and the top-down approach result in a loss of granularity at the provider level. Consequently, they are not able to show how the assembled members of a multidisciplinary team contribute to cost. Without this level of detail, it follows that it is then difficult to understand

Table 3 Time-driven activity-based costing for the face-to-face clinic using mean data (total visit cost: £31.08)								
Resource	**Tech 1**	**Tech 2**	**Tech 3**	**Consultant**	**Fellow**	**Fellow consult**	**Orthoptist**	**Orthoptist consult**
Mean personnel process times (minutes)	13	4.9	2.2	35	27		30	
Contribution to pathway (%)	100.0	21.0	29	28.57	42.86		28.57	
Contribution to pathway (minutes)	12.82	1.04	0.64	10.13	11.56		8.49	
Personnel cost per face-to-face clinic visit (£)	3.08	0.25	0.15	11.75	7.63	1.99	4.24	1.99

Tech, technician.

how efficiencies can be made through staffing. We are not aware of any published data looking specifically at the use of time-driven activity-based methodology to cost virtual glaucoma clinics.

Virtual clinics can address capacity if doctors are the rate-limiting step or if they allow activity to occur at times when consultant staff are not readily available. This can also permit equipment to be better used with consequent marginal costing savings. Their utility relies on the service being able to risk-stratify its patient cohort, as the virtual clinic model provides a way for stable low risk patients to be seen at pre-defined intervals tailored to the patient, for the acquisition of clinical data that can be reviewed safely at a later point in time. In doing so, these patients do not take up valuable F2F clinic appointments, leading to cost savings in several ways. For example, in a reduction in the need to run costly, 'catch up' initiatives such as when extra clinics are run on weekends and out of hours to tackle backlogs. Furthermore, the increased F2F clinic capacity would lead to fewer referral to treatment (RTT) breeches and hence fewer potentially costly fines, such as the £2500 fine for providers and commissioners per patient introduced by NHS England in April 2019 for anyone that waited more than 52 weeks from RTT.[25] To put this into context, the latest RTT data published by NHS England showed that nationally, as of February 2024, there were over 200 000 incomplete pathways in ophthalmology exceeding 18 weeks from referral.[26]

The landscape has changed significantly since the publication of the RCOphth guidelines, with enormous expansion in the use of virtual clinics across the continent.[27] Updated guidance from professional bodies that addresses how to safely manage 'new' patients would thus be beneficial in the post-pandemic era.

This costing exercise has shown how TDABC may be used to estimate the cost of a single patient's visit to the virtual and F2F glaucoma clinic. This study highlights how virtual clinic services can process patients for a similar cost to F2F, without as stringent staffing limitations. In contrast, F2F clinics are limited by clinic profiles that are governed by the seniority and qualifications of the team. For example, a consultant may be profiled a higher number of patients, while an optometrist may be profiled fewer. In contrast, a single clinician's virtual clinic list can be 18 new patients, and this increases to 24 for follow-ups. If we consider a consultant in isolation, with a waiting list of 100 patients made up of 50% new and 50% follow-up, this would take them 10 F2F clinics to get through. In contrast, the virtual service would require only 5. Looking ahead, the introduction of Advanced Care Practitioners from Health Education England[28] and more recently in ophthalmology[29] may achieve even greater efficiency gains, with training geared towards enabling non-medical workforce to develop specialist clinical skills and undergo independent reviews. This would be at a fraction of the costs, as compared with consultant reviews. It is prudent to consider the governance and oversight implications for an increased non-medical workforce capacity. Updated guidance on the utilisation of virtual services for diagnosis and triage would help to establish standards of care across the sector, given their widespread use across the NHS.

There are several limitations to this study, some of which have been outlined above. First, overheads were assumed to be constant for both and thus ignored. Second, the underlying assumptions and single NHS setting may limit generalisability to other situations. For example, while NHS consultant contracts and remuneration are relatively standardised, seniority levels vary, as do timetables, both within and across different hospitals, including the proportion of 'non-clinical' time. Furthermore, a greater number of patients and a greater number of locations would provide greater generalisability, since while the two F2F clinic dates chosen were selected to reflect the breadth of complexity reviewed in the in-person service, 42 patients are unlikely to have provided a truly representative sample of this cohort. This limitation is further compounded by the fact that severity of glaucoma was not examined, thus any differences, which would likely have had a significant impact on the time and thus cost of a visit, especially given the small sample sizes included, could not be accounted for.

The methodology used for data capture was modified to suit each setting and hence differed. Virtual clinic times were captured via 'analogue' means with a timesheet and stopwatch. In contrast, the real-time patient management system was used to clock the F2F patients and added to this was time taken up in discussions with the consultant, which had to be estimated.

Third, the virtual clinic data were captured while this service was purposely running on lower numbers than would be expected for the staff and equipment available. This was due to a measured implementation of the image acquisition clinics to ensure adequate training and quality control of the investigations and data. This may have introduced a variable that would have led to an underestimate of true virtual clinic efficiency and thus an overestimate of cost in this setting.

In contrast to the virtual clinic, the F2F clinic takes place in a busy shared clinic environment. The Intouch with Health patient journey platform was thus used in favour of manual data capture to provide an efficient way to collect timings that minimised the impact of the study on clinic flow. However, this software relies on all members of the multidisciplinary team correctly electronically tracking the patients into various locations along the pathway, making the system prone to human error.

Another important consideration is technology. Often, the diagnostic tests required to complete a full and complete new patient glaucoma assessment as per RCOphth guidelines require data acquisition through multiple user interfaces. For example, the patient history, visual acuities, refraction, intraocular pressure and central corneal thickness may be acquired and recorded on encrypted electronic medical record storage systems, the OCT of the optic nerve and Humphreys visual fields on another, and the anterior segment and fundus imaging on a separate software system. This high bandwidth of data transmission and graphical processing can lead to random-access memory overload and suboptimal, sluggish computer performance, and ultimately inefficient data acquisition and delayed patient reviews. Optimal computer processing capabilities and high-speed network upload and download speeds are recommended to accommodate the data demands for optimal acquisition and reviewer time.

Finally, how efficiently the virtual clinic infrastructure is used is an important point to consider. In this study, all the patients underwent every test because it was set up as a 'new' patient pathway. Amendments to this can be made such that otherwise stable patients who need just an intraocular pressure check or visual field, but not necessarily the full set of diagnostics, would allow for the pathway to be tailored to the patient, and thus make way for even greater capacity in the system and hence efficiency gains.

In conclusion, staff costs associated with visits to both the consultant-delivered virtual and F2F glaucoma clinics were similar, and this supports virtual clinics as a helpful means to provide capacity in the service, provided that outcomes remain similar for patients. Vigilance is thus required to monitor future outcomes and patient acceptability of both modalities.

Contributors VS and OK conceptualised project. VS and JA contributed to data collection. VS performed data analysis and produced first draft of manuscript. OK, TLJ and RTE revised several iterations. Final manuscript was reviewed and approved by all co-authors. OK is the guarantor.

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Competing interests King's Ophthalmology Research Unit receives funding for patients enrolled on trials of glaucoma. This study was not a trial that resulted in any such funding.

Patient and public involvement Patients and/or the public were not involved in the design, conduct, reporting or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants but the project was assessed by the King's R&D team with the HRA MRC decision tool and classified as audit, and hence deemed exempt from ethics approval. Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request.

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