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Why do GPs rarely do video consultations? Qualitative study in UK

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ABSTRACT

Background

Fewer than 1% of UK general practice consultations occur by video.

Aim

To explain why video consultations are not more widely used in general practice.

Design and setting

Analysis of a sub-sample of data from three mixed-method case studies of remote consultation services in various UK settings 2019-2021.

Methods

The dataset included interviews and focus groups with 121 participants from primary care (33 patients, 55 GPs, 11 other clinicians, 9 managers, 4 support staff, 4 national policymakers, 5 technology industry). Data were transcribed, coded thematically and then analysed using the Planning and Evaluating Remote Consultations (PERCS) Framework.

Results

With few exceptions, video consultations were either never adopted or soon abandoned in general practice despite a strong policy push, short-term removal of regulatory and financial barriers and advances in functionality, dependability and usability of video technologies (though some products remained “fiddly” and unreliable). The relative advantage of video was perceived as minimal for most of the case load of general practice, since many presenting problems could be sorted adequately and safely by telephone and in-person assessment was considered necessary for the remainder. Some patients found video appointments convenient, appropriate and reassuring but others found therapeutic presence was only achieved in person. Video sometimes added value for out-of-hours and nursing home consultations and statutory functions (e.g. death certification).

Conclusion

Efforts to introduce video consultations in general practice should focus on situations where this modality has a clear relative advantage (e.g. strong patient or clinician preference, remote localities, out-of-hours services, nursing homes).

HOW THIS FITS IN

- The pandemic provided strong impetus to extend remote consultation services in general practice, but video remains infrequently used.
- We used in-depth case study methods to explore the multiple interacting influences on the non-adoption and abandonment of video consulting in general practice.
- Telephone was considered adequate for most remote consultations; the need for a hands-on physical examination explained why video rarely replaced in-person assessment in the remainder.

INTRODUCTION

There was initial optimism that the pandemic would serve as a 'burning platform' to propel the UK National Health Service (NHS) towards widespread adoption of video consultations (1). In March 2020, NHS England moved quickly to fund new technologies for general practices (2); within a month, four out of five general practices had the capability to support video consulting (3). Scotland had established a national video consultation service in 2017; it was scaled up rapidly when the pandemic struck (4). In Wales and Northern Ireland, infrastructure was less developed and the digital pandemic response less well-resourced, but there were local pockets of innovation including some use of video (5).

These pandemic-driven changes built on longstanding policy enthusiasm for digital primary care (6-8). Yet the number of general practice appointments conducted through video have remained low (9). In England, for example, video and e-consultations combined accounted for fewer than 0.5% of general practice consultations in September 2021 (10). In this paper, we draw on a large dataset collected mostly in-pandemic to analyse why clinicians in general practice rarely use video.

METHOD

We identified and analysed a sub-sample of data from three mixed-method studies conducted by our team. These are summarised in Table 1 and described in detail elsewhere (4, 5, 11). These studies had different sponsors and focus but all sought to explain successes and failures and understand mechanisms at individual, technological, organisational and policy level. All involved interviews and focus groups with staff and patients (which were professionally transcribed, though not always in full, and uploaded onto NVIVO), collection of documents (e.g. policies) and process data (e.g. number of consultations by modality), analysis of artefacts (e.g. software), and surveys of staff, patients and other stakeholders. The Scottish evaluation involved pre-pandemic ethnographic visits (4).

TABLE 1

From a large combined primary dataset, we created a sub-sample of data from 120 participants on individual video consultations—including why some people did not do them (Table 1). Researchers on the three different primary studies, each of whom was familiar with the data they had collected, selected key sources (e.g. a memorable interview); we also searched our NVIVO database for the term ‘video’ and assessed hits for relevance. A sub-study of video group consultations will be presented in a separate paper.

We read all sources in the sub-sample closely, then coded extracts using the PERCS (Planning and Evaluating Remote Consultation Services) framework (Box 1 and Figure 1) (11). We invoked Rogers’ diffusion of innovations theory (see Discussion) to explain the dominant theme of individual clinician resistance (12).

BOX 1

FIGURE 1

RESULTS

As Table 1 illustrates, our dataset was drawn from primary care clinicians, patients and other stakeholders living in all parts of the UK and representing the full range of settings and jurisdictions. It is worth noting that despite this diversity, the similarities in findings across settings were more striking than any differences between them—notwithstanding some atypical counter-examples (illustrated in Box 2 and discussed in the text below).

A few clinicians in our sample worked in practices where video consultations had become business as usual. But most had never tried video and others had used it only briefly. Below,

we consider the multiple interacting reasons for the widespread non-adoption and abandonment of this modality in general practice.

BOX 2

The reason for consulting

Our interviewees commented that general practice consultations cover a vast range of conditions, concerns, levels of severity and kinds of risk. Many are unstructured, and even structured formats (e.g. oral contraceptive checks) may unfold in an emergent and non-linear way as additional patient concerns or opportunistic checks are brought in. In contrast, they felt, secondary care consultations typically cover a narrow range of illnesses and are often highly structured. A clinician-manager with a strategic role in remote consultation services reflected that whereas surgical consultations tend to be “hands-on” (surgeons assess patients by feeling) and favour in-person encounters, and physiotherapy consultations are often very visual (the therapist asks the patient to—say—move a limb and observes them), hence can often work well by video, general practice consultations are usually “conversation-oriented” (stakeholder interview [RBDS-NH1]).

Clinicians said that in a telephone conversation, they could often exclude a serious problem or establish a working diagnosis by taking a history and comparing it with their personal knowledge of the patient and the longitudinal medical record (*“I don’t need to see them to understand what they’re telling me or how they’re feeling about things, I can hear it I think.”*—GP interview [RBDGP-KI1]).

Some general practice consultations served an administrative function (e.g. renewing a sick note) or a pastoral one (e.g. bearing witness to suffering), both of which, many clinicians felt, could be achieved without a visual component. If further action was needed, the verbal

story often provided enough information to justify a test or referral without physical examination, though some statutory functions required a visual inspection (Box 2).

Acute problems were often dealt with by non-medical clinicians, who were generally comfortable providing “wait and see” advice (e.g. for a febrile but not unwell school-age child) on the basis of a telephone history, subject to a safety-netting plan with the option of in-person assessment.

Clinicians in general practice did not feel the need to examine every patient because in most cases, a physical examination would not change their management. But almost every practitioner we interviewed told a story of a patient who needed to be brought in for physical assessment when the verbal history revealed a “red flag” symptom (e.g. severe breathlessness) or when the conversational format afforded by the telephone proved unproductive. In such circumstances, they generally felt that video would not provide sufficient added value over an in-person encounter (*“[video] is basically a phone call with the added bonus of being able to see your face”*—GP interview [RBDGP-CH2]).

Most GPs considered neither telephone nor video appropriate for acute emergencies, which (they felt) needed either an immediate ambulance or a hands-on examination (*“[video] is never useful for, you know, for when you need a proper examination so an acute abdomen or a, you know, somebody with sort of shortness of breath or chest pain”*—GP interview [RBDGP-SS1]), though counter-examples are given in Box 2. They generally preferred to manage risk through in-person assessments or referring the patient on (e.g. to a dedicated Covid-19 assessment hub) rather than using video.

Whilst those with experience of video consultations had become adept at performing limited physical examinations remotely, these were often lengthy and challenging for both parties (because they involved giving and interpreting complex instructions (13)) and clinicians disliked having to judge whether it was safe to make compromises. In most cases,

an in-person examination was considered easier, quicker and likely to produce higher-quality assessment (but see counter-examples in Box 2).

“At the moment our rudimentary neurological assessment on a video consultation is to get patients to walk on their toes, walk on their heels, rub their hands up and down their legs to see whether they’ve got sensation and obviously we can’t do reflexes [remotely].” – GP in clinician focus group [RBD FG1-R6]

The patient

Most patients we interviewed had never had a video consultation. Some were unaware that video might be an option and some knew it was not an option in their practice. Of those who had opinions, some were strongly in favour of video consultations, usually because of a positive experience with a prompt and effective appointment—though almost all examples given were of secondary care or community physiotherapy.

In patient focus groups and workshops, there was strong consensus that practices should offer a range of modalities without making assumptions about which patients or conditions would be “suitable” for each approach. Some patients were opposed to video because they firmly believed that in-person consultations were inherently better.

Practice staff depicted some patients as unwilling to try video because they did not wish to appear on video (*“I offer it to most people with mental health conditions and most of them say, ‘I’d rather just do the phone’.”* [RBD2GP EH1]) or because they viewed it as an inferior option (*“I think people are getting more and more to wanting to go back to the old school and being able to come in, make an appointment, see their doctor”*—GP interview [HFVC19-GPW]).

Practice staff also depicted certain patient or disease groups as “unsuited” to video. The very old, for example, were seen as too set in their ways to adopt a new modality, though some clinicians described successful video encounters with older patients supported by family members. Video was considered more risky when patient factors increased the level of uncertainty—the very young or those with low health literacy, poor technical skills, communication difficulties of various kinds, cognitive impairments, or complex multimorbidity.

“[people with learning difficulties] would need to be seen face to face if they need an examination. They can’t explain their pain, nor where it hurts or what it feels like or how long it’s been and also the rapport’s just not there with video consult for those people” – Practice manager in support staff focus group [RBDFG2-R1]

Interviewees gave examples of patients who had been opposed to video “come round” to this modality after being encouraged to try it. But they also described vulnerable patients whose needs, they felt, would be met only by seeing them in person (*“...on video he [mental health patient] was just not coping with not real faces, he needed to see real faces”*—participant in support staff focus group [RBDFG2-R2]), though Box 2 gives a counter-example of a mental health patient who strongly preferred video to in-person. The capacity of patients with complex needs to use video could sometimes fluctuate, depending on both illness-related and social factors.

The clinical relationship

A personal relationship characterised by positive regard, trust and continuity over time is often celebrated as the cornerstone of high-quality general practice (14, 15), though not all patients want or need such a relationship for every encounter. Despite a small empirical literature on “therapeutic presence” in the digital environment (16), it remains unclear whether, in what circumstances and to what extent the clinical relationship can be developed and maintained via video. Some clinicians were convinced that close personal

relationships, built via in-person contact over months or years, would “wear out over time” [HFVC04-GPW] if in-person encounters stopped (though in theory video might be used occasionally as part of a mixed-modality service to *maintain* an element of continuity).

“Is there something about emotional transference? [In an in-person consultation] you can clock that someone is anxious about something that’s bugging them. You can open up a dialogue. Would that be less evident in a video consultation? Unless you know someone really well so you could already pick up on those cues?” –GP with interest in mental health [NMGP-DD1]

Some clinicians affirmed that they did video consultations primarily for “patient reassurance”, and patients occasionally mentioned this as an advantage of video.

Some clinicians and patients felt it was unclear how their respective roles should play out in the remote consultation, resulting in stilted interactions:

“maybe part of what we haven’t yet developed is a consultation etiquette for, for being online or on the phone”—Participant in patient focus group [RBDVG3-R1]

Balint wrote about the patient’s “hidden agenda” of socio-emotional issues (including anxieties about symptoms that might indicate serious illness) which a skilled general practitioner should help to surface (17). Both clinicians and patients expressed concerns that remote modalities may suppress this hidden agenda and reduce the number of “doorknob diagnoses” [RBDWS1] made.

The home and family

Participants in rural areas pointed out how video could save a long journey for the patient or a health professional visiting them. But they expressed concern that increasing reliance on video consultation services, many of which were accessed through smartphone apps, could create a two-tier service (which was, de facto, a digital-priority service) given the poverty of digital infrastructure in some locations and the limited digital set-up in some homes. The introduction of home-schooling during the pandemic had prompted better-off families to invest in, and become familiar with, videoconferencing technology. But whereas most people can access telephone, poor families may have limited broadband capacity and share smartphone or webcam access between several members.

Staff attitudes

Staff attitudes towards video consultations were influenced by their own technical competence and confidence, their experience and knowledge (including personal knowledge of the patient **and whether they themselves had actually tried video**), their perceptions of quality and risk, the cognitive demands of different modalities, job satisfaction, and (lack of) role models.

Practice staff varied in **their digital experience**, digital literacy and confidence. Some were described as “absolutely petrified” of video [nurse interview, RBD-UH1]. One participant described a video mental health support programme to which staff had more difficulty connecting than patients. While some described technology failures (see below), most considered technical barriers minor (“*[video consulting] is really quite straightforward*”—GP interview [RBDGP-EG1]).

Whilst many clinicians mentioned medicolegal concerns (e.g. fear of litigation from a missed diagnosis), most felt that choice of modality (e.g. phone, video or in-person) was driven primarily by the best interests of the patient. Clinicians varied in their tolerance of clinical

risk, with some described by their colleagues as “anxious” (i.e. having a low threshold for defaulting to in-person consultations) and others as “over-confident” (having a high threshold).

Clinicians generally found video consultations more cognitively demanding than face-to-face or telephone ones. Even when there was some visual input, the signals were more limited than an in-the-flesh encounter (one described it as “2D rather than 3D” [RBDGP-FM1]). Clinicians also felt they gained less job satisfaction from video and telephone consultations than in-person ones. Older clinicians in particular talked of the sense of fulfilment going out of a job they had enjoyed all their professional lives, because of the more limited human connection achieved remotely.

“we’re more stressed now than we’ve ever been. Everyone is. There’s additional stresses I know – the schools are closed and there’s the day to day things. But sitting there, day to day, doing everything by phone. [...] Just a day or two ago we started doing some face-to-face clinics again. Everyone’s much happier. They’re all commenting how much happier it is face-to-face. [Are you using video at all?]. Yes very occasionally. It didn’t really work for us. Except we get them to send photos for dermatology. The photos are meaningful. But mostly the phone is fine.”—GP interview [NMGP-CY1]

Box 2 gives counter-examples of younger clinicians who were confident with video technology and felt it helped them manage risk and interact with patients they did not know well.

One reason clinicians gave for not adopting video or abandoning it was that nobody else was using this medium (*“it’s really hard to keep being an outlier when everybody that you’re working with thinks it’s a strange way to work”*—GP who had been a video consultation enthusiast but later abandoned them [RBDGP-CH3]). ‘Champions’ for video consulting were

few and far between, and some clinicians and support staff considered this modality a passing fad.

General practices (organisation domain)

Practices varied widely in their digital maturity, the priority they gave to introducing innovations and how much spare resource they had to implement and evaluate them. Many were overstretched and understaffed. Several participants said that their practice had invested in video technology but had not got round to installing it, training staff to use it and developing new workflows to accommodate it into business-as-usual. In some practices, only one or two rooms were equipped for video calls so clinicians had to share them, causing bottlenecks. However, technological advances (see below) meant that for certain products, there were few organisational hurdles.

The type of consultation offered to patients was often heavily influenced by the need to manage practice workload:

“We’ve tried to kind of go back to the point of, ‘Okay what, what is the problem? What is it that you need to discuss with somebody?’ and we’re not promising that they’ll even get a telephone call. [...] [A] patient phones up, reception take as much detail as possible [...] and then the GP will read that and decide whether they want to call them, video call them or send them a text.”—Practice manager interview
[RBDPM-FT1]

In many practices, telephone call-backs had become the default remote option. Such calls were relatively easy for the practice to offer since patients were rarely given a specific time slot. Video was seen as logistically more challenging.

“In secondary care, they just see the clinic list and send the patient a link [in advance]. Whereas for us, if we’re doing an acute review, we need to send the URL to the patient on the same day. And we see a lot of patients in a day. And the processes are complex – there are lots of areas we have to build it into: care home appointment, acute appointment, routine appointment, minor surgery, family planning, long term condition review, and so on.”—GP with national quality improvement role [NMGP-TL1])

From the patient’s perspective, they found it relatively easy to step out of a meeting or find a quiet space in a shopping centre to take a phone call from their clinician, but a video call required more privacy and had to be carefully pre-arranged.

Some participants speculated about future scenarios in which video consultations might add value – for example, to enable home-working thereby freeing up limited practice space for essential in-person consultations. We did not, however, directly observe such arrangements.

Technologies

Telephone is a familiar and dependable technology which almost everyone knows how to use. Video technology, on the other hand, may be unfamiliar (at least in this context); it may not work at all or it may fail to provide adequate audio or visual quality for a satisfactory encounter. Even though most video consultations were technically adequate, they were described as “fiddly” to set up and did not always provide adequate visual or audio quality (*“I suppose because our initial consultations were so difficult, we have gone mainly telephone”* —GP interview, locality with poor broadband [HFVC06NI]). The fact that a percentage of video consultations failed for technical reasons was considered time-consuming, frustrating and professionally embarrassing.

Developers of bespoke video consultation software described how they had worked before and during the pandemic to make the technologies easier to use and more reliable. Key technical advances included removing the need for either party to download software, install peripherals such as webcams and headphones, or obtain and use access passwords. One company had developed a smartphone-based product which allowed the clinician to convert a telephone call to a video call without hanging up, thereby reducing double-handling. The same product allowed text, photograph and document transfer, which significantly increased its appeal. Photographs sent by this route were considered to provide better image quality than video.

These advances made video consulting operationally smoother, and policymakers depicted the novel products in plug-and-play terms, requiring little or no additional infrastructure, new routines or training (national stakeholder interview [RBDNS-NC1]). However, not all practices had selected these new-generation technologies (and in some settings they were constrained by a locality-wide purchase of an inferior product). Even when they had, clinicians and patients still found the telephone more reliable, quicker and more intuitive.

The wider system

In most of the UK, the pandemic triggered extensive healthcare innovation with rapid implementation of cross-government emergency measures to fund technology development, reduce red tape, align incentives and support installation and use of new technologies (5). The very favourable policy context, along with unprecedented effort from clinicians and managers, enabled many NHS organisations to acquire the capability to deliver a video service back in March 2020. But this did not translate into widespread uptake and use of video consultations partly because, as described above, the relative advantage of video was unclear and partly because the near-absence of practices with up-and-running video services meant that there was no mimetic pressure to conform with this organisational innovation (18). A reviewer suggested that local rules of thumb such as refusal of secondary care clinicians to accept referrals unless the patient has been seen face-

to-face would be a powerful disincentive to GPs using video, though we did not find any examples of this in our own dataset.

DISCUSSION

Summary

This qualitative analysis explored why, with few exceptions, video consulting was either never adopted or soon abandoned in UK general practice. Applying the different domains of the PERCS framework (Figure 1), this was despite many enabling *wider system* factors (e.g. a favourable policy context, removal of many regulatory and financial barriers) and significant advances in many of the *technologies* (e.g. in functionality, dependability and usability). Whilst residual limitations in some technologies ('clunkiness') explained some non-adoption and abandonment, another key reason was lack of relative advantage of video for dealing with the *reason for consulting* (many presenting problems could be sorted adequately and safely by telephone and an in-person assessment was considered necessary for the remainder). Video sometimes added value, however, for out-of-hours and nursing home consultations and statutory functions (e.g. death certification). *Patients* were variably capable of participating in video consultations and their views on this modality varied (some gained reassurance from seeing the GP's face on video while others found therapeutic presence was achieved only in person); patients' *home circumstances* sometimes precluded the video option. *Staff* also had variable skills, confidence and experience in video consulting and both staff and patients felt that the *clinical relationship* was more easily initiated and maintained face-to-face.

Strengths and limitations

This study benefited from a large qualitative dataset collected at a time when, uniquely in history, the contextual preconditions for introducing video consultations were extremely positive. The PERCS framework, whose development and rationale is described in detail elsewhere (11), enabled us to map multiple interacting influences on the adoption, spread

and sustainability of video consultations. This is a rare example of a study of non-adoption and abandonment of a technological innovation and thus helps correct a pro-innovation bias in the literature. By highlighting counter-examples (Box 2), we were able to refine our explanatory model.

The main limitation is that pandemic restrictions made ethnography impossible (except for a brief period pre-pandemic) so we were unable to observe video consultations in general practice directly. In addition, our data collection occurred in a very particular historical context (mid-pandemic, with a positive policy push). We did not capture the dramatic policy reversal in UK in September 2021 (following a media-led campaign) from “remote-by-default” (19) to “GPs must see patients in-person if requested” (20), which may have reinforced negative attitudes towards remote forms of consulting. The transferability of our findings beyond a UK setting is unknown.

Comparison with existing literature

Our findings resonate with the conclusion of previous researchers that most technological innovations introduced into healthcare settings “*fail because, despite high investments in terms of both time and financial resources, physicians simply do not use them*” (page 309) (21). In his book *Diffusion of Innovations*, based on hundreds of empirical studies, Rogers defined six attributes of innovations which, in the eyes of potential adopters, account for variation in the speed and extent of adoption: relative advantage, low complexity, compatibility, trialability, observability, and potential for reinvention (12). The most important is relative advantage: if the intended adopter sees no advantage over existing practice, they will not adopt—or will quickly abandon. In most sites in our study (Northern Ireland being an exception), technical infrastructure was adequate and some though not all video technologies were simple and easy to use. GPs were able to try out these technologies and observe their impact. Video was—for some consultations—compatible with professional values, standards and ways of working. But its advantages were, for most general practice case load, minimal, and because few clinicians were enthusiastic users there was normative pressure on clinicians to *not* use this innovation.

We have recently reviewed the extensive research literature on video consultations collected pre-pandemic (11); it consists mostly of experimental trials conducted in secondary care on highly selected patients with stable chronic conditions, hence has limited relevance to real-world general practice in a pandemic setting.

Our findings accord well with other in-pandemic studies of remote general practice services. In a detailed quantitative and qualitative study of remote care in Bristol, UK in 2020-2021, Murphy et al showed that 1% of consultations overall and 3% in the over 80s occurred by video (9). Like us, they found telephone adequate for many remote consultations and in-person assessment preferred for most of the remainder. They also found that a photograph-plus-telephone was often preferred to visual examination by video, but concluded that video sometimes had added value for *“children, nursing homes, multidisciplinary team meetings, and problems that require dynamic assessment”* (page 174) (9).

Implications for practice

As Tudor Hart said, much general practice consists of doing simple things well, for large numbers of people, few of whom feel ill (22). The pandemic has shown that these “simple things” can often be achieved by telephone but that in-person encounters are necessary for some patients. The video option, even with modern easy-to-use technologies, may be overly complex for the former case and a poor substitute for hands-on interaction in the latter.

As noted by a reviewer of an earlier draft, whilst our findings explain the current low use of video in general practice, they reflect how staff and patients *currently perceive* video consultations rather than how these individuals might feel if they had a chance to try out video in different kinds of consultations. This observation relates to what Rogers called the trialability of the innovation—how easy it is to try it out and see its impact without committing to adopt it (12). Given the current pressures on general practice, the trialability of any innovation is limited.

Rather than trying to encourage video consultations across the full case load of general practice, we suggest that this modality should be targeted, at least initially, to situations where video offers a clear relative advantage. These include—but may not be limited to—situations where there is a strong preference to avoid an in-person visit (e.g. remote localities, patient choice, less experienced clinician, one party shielding), when “eyeballing” a patient is likely to add value to a telephone call (e.g. some out-of-hours calls, nursing home virtual visits) or when a statutory visual inspection is required.

In conclusion, the image of remote consulting often portrayed by the media—with doctor and patient connecting via their smartphones by video link—is currently inaccurate. The old-fashioned telephone is widely used and appears fit for purpose for some but not all general practice consultations—though, somewhat ironically, there is relatively little research on this modality. Our findings suggest that in-person consultations remain the gold standard for many though by no means all clinical interactions. As general practice faces an uncertain future characterised by a continuing pandemic, rising demand, staff shortages and cash constraints, research on how best to allocate different appointment types is surely a priority.

Declaration of interest:

The authors declare no conflicts of interest.

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Author contribution:

TG, JW and SS were co-principal investigators on the various primary studies. All authors were involved in data collection. TG, SW and EL collated and analysed the sub-sample of data on video consultations. TG wrote a first draft of the paper. All authors contributed to refining the paper and finding illustrative quotes. All authors approved the final manuscript.

Ethical approval:

The research was reviewed and approved by NHS East Midlands Leicester Central Research Ethics Committee (REC ref 20/EM0128; IRAS ID: 283196 and subsequent amendments).

Data availability:

Raw data will be shared with suitably qualified researchers on application to the lead author.

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FIGURE 1: PLANNING AND EVALUATING REMOTE CONSULTATION SERVICES (PERCS) FRAMEWORK

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TABLE 1: SUB-SAMPLE OF DATA USED IN THIS STUDY

Wider research study	Main research question	Sampling frame for wider study	Sub-sample of data on video consultations in general practice analysed for this paper	Key perspectives captured in sub-study dataset
Government-funded evaluation of 'Near Me' video consulting service in Scotland 2019-2020 (4)	What can we learn from a national mixed-method evaluation about the knowledge, capabilities, and infrastructures needed to support the introduction and use of video consultations?	Primary and secondary care video consultation services in all 14 health boards in Scotland before and during the pandemic	27 interviews (2 patients, 16 GPs, 2 other primary care clinicians, 1 clinical director, 1 manager, 1 technology supplier, 4 policymakers) plus focus group of 7 GPs. Ethnographic field notes from site visits	Primary care staff and patients mostly living in rural and remote areas, supplied with a government-funded video consultation service.
Research-council funded case studies of in-pandemic remote general practice in England and Wales 2020-2021 ('Remote by Default 1') (10)	How can technology support assessment and monitoring of patients at a distance? How can we achieve rapid spread and scale up of remote-by-default models of primary care? How can we strengthen the NHS to support remote healthcare?	Video, phone and e-consultation services in 4 locality-based study sites during the pandemic	39 interviews (19 GPs, 8 other primary care clinicians, 4 GP support staff, 6 managers, 1 clinical commissioning group director, 1 technology supplier). 4 focus groups involving 4 GPs, 2 other clinicians, 3 support staff, 6 patients and 3 technology suppliers. Notes from study of technological artefacts.	Primary care staff and patients from four contrasting localities (English coastal town, English university city, diverse inner-city English borough, Welsh town and surrounding region)
Charity-funded case studies of spread and scale-up of video consultations across UK ('Health Foundation Video Consultation study') (11)	How have UK's video consulting services spread and been scaled up in the context of COVID-19? What resources are needed to support and sustain them going forward? What are the consequences of rapid scale-up in times of crisis?	Primary and secondary care video consultation services (individual consultations and group clinics) in 11 study sites across England, Scotland, Wales and Northern Ireland during the pandemic	10 primary care clinician interviews (9 GPs, 1 advanced nurse practitioner), 10 patient interviews and 2 focus groups with 15 patients (most patient discussion of video related to their experiences in secondary care).	Primary care staff and patients selected from across UK to obtain mix of urban/rural, affluent/deprived, professional role, and experience of video consulting.
TOTAL SAMPLE			55 GPs 11 other primary care clinicians 9 managers or directors 4 support staff 4 national policymakers 5 technology industry 33 patients	

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BOX 1: PLANNING AND EVALUATING REMOTE CONSULTATION SERVICES (PERCS) – EXPLANATION OF DOMAINS

The PERCS framework (Figure 1), whose development and rationale is explained in detail elsewhere (11), is an adaptation of a more generic framework for considering the complexities involved when introducing new technologies (NASSS (23)). PERCS consists of 8 interdependent domains:

1. *The reason for consulting* covers the illness or condition and why the patient wishes to be seen (or why the clinician wishes to see them) now. It considers the urgency, rate of progression, whether the appointment is patient- or clinician-initiated, and what advice or treatment is being requested.
2. *The patient* includes attitudes towards illness and remote consulting, which are influenced by their identity, values, personality traits, beliefs, health and digital literacy, and lived experience of illness or disability.
3. *The clinical relationship* includes the level of mutual trust and positive regard (often though not always linked to duration of relationship) and how well the clinician and administrative team know the patient.
4. *The home and family* includes how the material features, physical layout, symbolic spaces and interpersonal dynamics of the home influence whether and how the patient consults remotely. Disadvantaged people may have no home, or one which is small, crowded, lacking privacy or not digitally connected. Family members may support—or block—the patient’s digital access.
5. *Technologies* includes the functionality, technical performance and ease of use of key technologies as well as their dependability and familiarity. It also covers the technology’s supply chain and its maintenance and repair.
6. *Staff* embraces staff attitudes (grounded in professional norms and values including those relating to quality and safety of care), their digital literacy and confidence, vulnerability to infection, and levels of exhaustion. Aspects of staff members’ home environment may be relevant if working from home.
7. *The healthcare organization* includes innovativeness, readiness and normalization efforts. Innovative organizations tend to be large, well-led, non-hierarchical and with adequate slack (people and resources that can be channelled into new projects) (24). Readiness for innovation requires both top and middle-management support, absence of opponents, and assessment of innovation-system fit (e.g. a business case). Normalization includes supporting staff to make sense of a new technology in the context of their work; engaging them to participate; coordinating efforts to implement; and monitoring benefits and costs (25).
8. *The wider system* includes the policy context (e.g. technology-enabled care, planetary health, social and digital inequalities) and infrastructural elements such as broadband availability. It also includes opportunities for inter-organizational influence and learning (early-adopting organizations pass on insights and resources to those coming on stream later) (24).

These domains interact and evolve dynamically over time. PERCS framework also includes two side panels—*digital maturity* of the organization (26-29) and *digital inclusion* for the population it serves (30-35). The domains of the framework are underpinned by the principles of healthcare quality (36), clinical ethics (37) and the ethics of care more widely (38).

BOX 2: COUNTER-EXAMPLES WHERE VIDEO ADDED VALUE

The examples below show that some clinicians had used and valued the video format in situations where many interviewees had said it did not add significant value.

Out-of-hours care

Particularly in out-of-hours contexts (where pre-threshold probability of pathology was higher and level of risk greater), some GPs used video as an adjunct to telephone for rapid visual assessment (“eyeballing”), especially for children. Video was also used for reassurance and following up problems that had not resolved.

“I can see on their [parents'] faces whether they've been reassured by my description of why I'm not worried about their kid's breathing etc. and I know whether I can leave it there or whether they're going to end up needing to come in anyway”—GP interview [RBDGP-CH1].

Nursing homes

Video was deemed helpful for linking with nursing home staff to discuss complex patients [HFVC19-GPW], “eyeballing” unwell patients, especially in the pandemic context where in-person visits carried a risk of reintroducing infections to vulnerable patients, and for statutory functions.

“The times I use it [video] regularly is for nursing homes – it is legally required for me to see a patient to write a death certificate and it is now allowed to see them digitally.”—GP interview [RBDGP-NL1]

Emergency assessment of very unwell patients

While video did not change management in most emergencies, it sometimes provided a crucial clue.

“I could just see how breathless she was and I was counting her respirations on the phone and, you know, I couldn't pick it up on the phone, I spoke to her first and said, ‘I think let's do a video call’, and it was like ‘Gosh, she's a lot more breathless than I realised’.”—GP interview [RBDGP-EH1]

Talking a patient through self-examination

While remote physical examination was often unhelpful, one GP interviewee [RBDGP-KI1] reported a trainee picking up a case of appendicitis using patient self-examination on video.

Mental health patients

While some mental health patients strongly preferred in-person contact (see main text), some were much better able to access the care they needed by video.

“So, to be able to know that I can just sit... be at home and still have that consultation, honestly it's amazing, and thinking back to in the past when I used to suffer from mental health difficulties, I used to cancel quite a lot of my appointments because I didn't want to go out.”—Interview with patient (remote locality) [HFVC02].

Less experienced clinicians

Some trainees and early-career GPs or trainees, who were familiar and confident with new technology, reported using video to compensate for their limited knowledge of the patient and limited experience managing risk in general practice (e.g. RBDGP-KD1).

Chronic disease check-ups

Some nurses used video to help assess lifestyle and coping in chronic disease self-management.

"You get a bit more from patients if you can actually see them as well. One [chronic disease review] that I did, the patient was having a cigarette while I talked to him!"—Nurse interview [RBDPN-MS1])

Patients with communication challenges

All interviewees agreed that telephone was unhelpful for the hard of hearing and limited English speakers. Some felt that video could be a worthwhile alternative to in-person contact for such patients.

"A video could be quite useful with language barriers because you can, you can kind of see the gesticulations and things like that a bit, a bit more easily, so I might do a video quickly if, if I wasn't sure about the history. And I think you'd quickly see how much discomfort he would be in"—GP in clinician focus group [RBDG1-R1]