Chapter 4 : The organisational context shaping virtual consultation services (meso level)

In this chapter, we focus on the implementation and use of virtual consultations via Skype within participating services, including Adult/Young Adult Diabetes, Antenatal Diabetes and Hepatobiliary Pancreatic Cancer Surgery services. We also briefly cover the planned roll-out of virtual consultations in other clinics and settings in Barts Health NHS Trust (as part of a wider strategy of mainstreaming this service model within the trust, linked latterly to the local sustainability and transformation plan).

This section should be read in conjunction with the description of Barts Health NHS Trust and the historical background of introducing virtual consultations in the Diabetes service, which began in 2009 (see *Chapter 2*).

Overview of virtual consultations in Diabetes and Cancer Surgery services

Virtual consultations in the Adult/Young Adult Diabetes service

The Diabetes service at Barts Health NHS Trust runs an outpatient clinic for adults and a separate clinic for 'young adults' aged 15–25 years (Monday through Thursday each week). Because diabetes is a lifelong condition, most patients are well known to all regular clinicians (both doctors and nurses). During the study period (March 2015 to July 2017), virtual consultations were offered to patients considered suitable (in practice, most of them), as an alternative option to face-to-face clinic attendance. This 'mainstreamed' approach, in which virtual consultations are used flexibly in conjunction with face-to-face appointments depending on the choice and support needs of the patient, is the result of several years' piloting and embedding work by the Diabetes team from 2009 (see *Chapter 2*, *Setting and context*). Typically, patients see the consultant and diabetes specialist nurse every 4 months (but may be invited to attend more frequently if clinically indicated). Virtual consultations via Skype are conducted alongside the outpatient clinic service, within the same clinic space.

Over the study period, only 3.6% of consultations were formally logged on the trust's system in the Adult/Young Adult Diabetes service as being undertaken virtually. These 'official' figures are widely considered to be a significant underestimate, and give limited insight into the level and complexity of activity that has actually been taking place in the clinic throughout the time of the study or the ways in which clinic staff and patients have repurposed the technology for a more subtle adaptation of the virtual consultation service. As we describe in *Clinic management and administration*, the administrative processes involved in scheduling and rebooking appointments in all three clinics require varied tasks involving different people (e.g. the clinician making a note of the next appointment on the required form and taking this to the receptionist, who then made a booking with the patient on the electronic system). Repurposing this process for virtual consultations was, at first, fairly straightforward. By the end of the study period, the video option had become a stable (although not yet fully embedded) service in the Adult/Young

Adult Diabetes Clinic (see *Figures 3* and *4*), but had evolved in a different way from the original plan. Alongside scheduled Skype consultations, the consultant and clinic nurses had begun to conduct ad hoc clinician-led 'extra' appointments (e.g. to quickly check on a patient after an adjustment in treatment) and/or ad hoc patient-initiated encounters ('seeing' the doctor or nurse as present online and requesting a 'quick Skype' to discuss an immediate concern).
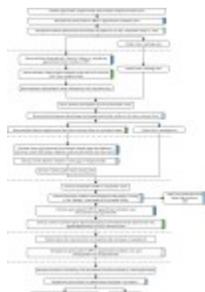
FIGURE 3

The routine for a face-to-face consultation in the Adult/Young Adult Diabetes clinic.
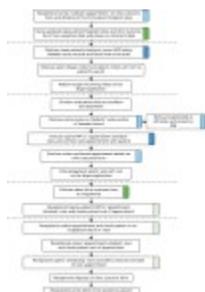
FIGURE 4

The routine for a virtual consultation in the Adult/Young Adult Diabetes clinic. ID, identification.

As the lead clinician for the service told us, 'this has increased patient engagement hugely'. This comment should be interpreted in the context of a diabetes service focused (unusually) predominantly on young adults, the majority of whom are from deprived and/or minority ethnic backgrounds. Maintaining patient engagement is one of the key challenges (a major trigger for introducing virtual consultations was a DNA rate of around 50%, and a significant minority of patients whose glycaemic control was abysmal and whose records evidenced long-term lack of engagement with the service). Patient-initiated virtual consultations sometimes came from this 'hard core' of non-engaged or minimally engaged patients – who were at high risk of hospital admission for acute metabolic problems and of long-term kidney, eye, foot and cardiovascular complications, and who otherwise had not contacted the service in months nor responded to invitations.

Ad hoc and patient-initiated consultations were not easily recorded on the system. One reason for this is that part way through the study, the diabetes specialist nurses began to shift over to using the 'EMIS Health' electronic record system (a system widely used in primary care). In contrast to the Cerner electronic records used traditionally in the diabetes clinic, there is no straightforward way for staff to record a 'webcam' consultation as codified (and hence searchable and aggregable) data. Hence, what feels like an onerous administrative process takes

much-needed time away from clinical care. Another issue is that many ad hoc and patient-initiated consultations are extremely short (perhaps a brief exchange of messages or a 1- or 2-minute video follow-up after a longer consultation, to confirm that all is well following a change in therapy). Recording of such consultations tends to happen reliably only when there is a significant change in a patient's care or treatment (a new drug for instance).

Other ad hoc instances of virtual consultations are not now formally recorded and are simply embedded in the ebb and flow of patient care and clinic routines. For patients who, for instance, have comorbidities or experience significant life events (e.g. a first pregnancy with gestational diabetes), these ad hoc virtual consultations appear to have become an inseparable part of the diabetes service, offering a means of engaging with a named clinician at times when they are in need of clinical advice (e.g. about very high blood sugar levels or titration) and/or emotional support. It is at the point when such patients are seen in the clinic (usually every few months) that the activity gets formally recorded in a letter to the patient's GP, informing them about the regular Skype contact.

Hence, while only 3.6% of pre-booked outpatient appointments for the consultant diabetologist were formally coded on the electronic record as having occurred via Skype, the actual proportion was estimated to be around 20% (as a result of ad hoc consultations not being scheduled through the EPR booking system and, hence, not being visible in clinic audits). For the Young Adult Diabetes nurse appointments, all clinical encounters were documented on a separate diabetes management system (Diamond; Hicom Technology, Brookwood, UK). In the first year of the study, 8% of all pre-booked consultations were undertaken via Skype. During the same period, the DNA rate for virtual consultations was zero (compared with 39% for face-to-face consultations).

Those patients taking up the virtual consultation option in both nurse- and consultant-led clinics within the service were similar in terms of gender, with a slightly higher (but non-significant) proportion of white British/European patients (*Table 4*). There was a significant difference in the age of patients for consultant-led appointments [$\chi^2(3, N = 307) = 11.7$; $p = 0.01$], with a higher proportion of patients in the younger age category (aged 16–34 years) taking up the virtual consultation option, and no patients aged > 55 years.

TABLE 4

Demographic profile of patients attending the Adult/Young Adult Diabetes clinic

The Diabetes Pre-Pregnancy Clinic at Barts Health NHS Trust (part of the Adult Diabetes service) supports women with diabetes who are planning to conceive in the near future, on the grounds that the outlook for the fetus is best if tight diabetes control is achieved 3 months before conception. In contrast to the other two diabetes clinics described above, this service does not

have designated clinic or office space, and so a major challenge was setting up and managing virtual consultations across multiple spaces in the hospital – a complex logistical challenge not anticipated in the documents or interviews in our macro-level data set. Notwithstanding these logistical issues, virtual consultations continue to be viewed as a potentially useful means of helping to achieve tighter diabetes control in young women who are often highly motivated, but who do not yet have the additional risk or metabolic volatility of a current pregnancy. Implementation of virtual consultations in this service continues as part of a wider restructuring of the service (including staff roles and treatment programmes).

Virtual consultations in the Antenatal Diabetes service

Barts Health NHS Trust offers an Antenatal Diabetes Clinic that supports women with diabetes throughout their pregnancy. Although virtual consultations with non-pregnant adults with diabetes were already business as usual, the combination of diabetes and pregnancy raised additional challenges. Many (although not all) women in this group are recently diagnosed and have no pre-existing relationship with the diabetes doctor or nurse. Diabetes in pregnancy must be tightly controlled to avoid damage to the developing fetus, but, for metabolic reasons, is sometimes very difficult to control. Diabetes during pregnancy usually requires frequent adjustments of medication that need reviewing after only a few days. The Antenatal Diabetes Clinic provides ongoing assessment and support for patients with pre-existing diabetes and for those women who have developed gestational diabetes since becoming pregnant. To create space for some follow-ups to be undertaken remotely, a virtual clinic was created for Tuesday afternoons (a time when the lead consultant had confidential office space available).

An early observation was that this clinic was by far the busiest of the three settings within the diabetes services, with a very high throughput of patients [a clinician typically saw 30–35 women per clinic, in appointments lasting an average of 8 minutes and with no personal lists (i.e. each clinician tended to call the next patient in the queue rather than a patient they had seen previously)]. During the study period, virtual consultations were offered to highly selected patients as an alternative to visiting the hospital for follow-up appointments 3–4 days after a clinic visit (see discussion on this in the next section, *Virtual consultations in the Hepatobiliary and Pancreatic Cancer Surgery service*). When an initial pilot showed that only around 1 in 50 eligible women was being offered virtual consultations, the option was discontinued in this setting (see the discussion on this in *Evolution of virtual consultation services over the study period*). In total, of the 6562 Antenatal Diabetes follow-up consultations conducted during the pilot period (July to November 2015), approximately 1320 were undertaken by the consultant offering the remote option and 24 (around 2% for this consultant) were done virtually. However, it is worth noting that, although 1320 patients were logged onto the EPR system as having their consultations undertaken by this consultant, the way in which the clinic team works (often seeing the next patient rather than sticking to their own personal list) means that some of those patients will have been seen by other members of the clinical team and that the overall proportion of virtual consultations is likely to be slightly higher for that consultant.

The profile of patients taking up the option of the virtual consultation service in the Antenatal Diabetes clinic was very similar in terms of ethnicity, compared with those in face-to-face

appointments (*Table 5*). Patients taking up the option of the virtual consultation service were slightly more likely to be white British/European and tended to be in a narrower age range than those attending only face-to-face consultations. These differences were not statistically significant.

Demographic profile of patients attending the Antenat

Characteristic	Value
Diabetes Antenatal (remote)	
Age (years), range (median)	30–37 (34)
Ethnicity (%)	
White British/European	20
Black Caribbean	10
Asian	60
Other	10

TABLE 5

Demographic profile of patients attending the Antenatal Diabetes clinic

Virtual consultations in the Hepatobiliary and Pancreatic Cancer Surgery service

The Hepatobiliary and Pancreatic Cancer Surgery service at Barts Health NHS Trust is a tertiary referral service that takes patients living up to 200 miles away. The patient typically sees both the consultant and specialist nurse during their appointment. However, this is often decided during the running of the clinic, with the nurse on some occasions leading a consultation alone (e.g. with a routine follow-up appointment), but the consultant being available at the clinic to address complex clinical issues and concerns.

Virtual consultations were introduced in 2015 for selected patients who had undergone surgery for pancreatic or liver cancer, primarily to save the patient a long and arduous journey in the period following major surgery. Virtual consultations were initially offered within a designated time slot (Monday afternoon), and conducted with both the consultant surgeon and the nurse specialist together (because cancer care is by nature interprofessional and often requires a dialogue between surgeon, nurse and patient). In all cases, patients were selected for virtual consultation based on the consultant's assessment that they would not require a physical examination at that appointment. The Monday afternoon slot was initially chosen for practical reasons (the surgeon and nurse were often in theatre, running clinics or on ward rounds), and so a specific time had to be established. However, over the course of the study, the consultant and the nurse decided to incorporate the use of Skype within their usual face-to-face clinical work, in order to maximise the scope and frequency of appointments. For instance, this allowed the nurse to initiate and progress the consultation, with the consultant available to join or support the consultation when needed (as in a usual face-to-face clinic), as opposed to both the consultant and the nurse being present for the full duration of the appointment.

During the study period (November 2015 to July 2017), 12 virtual consultations were undertaken in the Hepatobiliary and Pancreatic Cancer Surgery service, out of 161 total consultations (i.e. 7%). However, it is worth noting that the proportion has been steadily rising and, towards the end of the study, it was 20% of all consultations. Those taking up the option of the virtual consultation service were somewhat more likely to be female and white British/European than

those attending face-to-face consultations only, but these differences were not statistically significant (*Table 6*).

Characteristic	Value
Cancer Surgery follow-up (remote)	
Age (years), range (median)	55-84 (70)
Gender (%)	
Male	42
Female	58
Ethnicity (%)	

TABLE 6

Demographic profile of patients attending the Hepatobiliary and Pancreatic Cancer Surgery follow-up clinic

Evolution of virtual consultation services over the study period

In each of the three clinics, virtual consultations have been introduced slowly and adaptively. Prompted by initial enthusiasm from clinical leads and a desire to provide technology-enabled care (often as a means of increasing access for patients and/or easing demand within the service), each clinic typically began by piloting a virtual consultation service outside their usual clinic routines, and with a small number of carefully selected patients (selection being based on clinical judgement about the condition of the patient). This pilot period lasted a minimum of 6 months and allowed clinical and administrative staff protective time and space to learn about the technology and how best to link it with routine clinical care. It was only once this process of experiential learning had taken place and staff felt confident in the use of the technology that they felt able to adopt and embed it within the usual clinic routines or, as in the case of Antenatal Diabetes, make a decision not to adopt the technology at that time.

In the Adult/Young Adult Diabetes clinic, the virtual consultation service was already established when the study began. The service was initially offered in 2011 by the lead consultant, before gaining positive feedback from patients, evaluating the service and then extending it to other clinicians. As the service became more embedded in routine care, so it evolved to embrace both clinician-initiated contacts (via formal Skype appointments) and patient-initiated contacts (via the Skype messaging service). The former were planned and scheduled, whereas the latter were (largely) ad hoc, depending on the needs of the patient and the availability of the clinician. This evolution of the service was informed by patients' and clinicians' expectations of the service, having gained experience of using Skype in the context of their clinical care. However, by the end of the VOCAL study, it was noteworthy that some doctors and nurses did not offer the option of virtual consultation, and the virtual consultation service remained limited to certain clinics, suggesting that, despite the enthusiasm of some clinicians, the service is not yet fully embedded, even in the service that originally introduced it.

To date, the evolution of the service – particularly its adaptation over time to include more patient-initiated contact – has informed the development of wider organisational support for virtual consultations in Barts Health NHS Trust. For instance, knowledge of clinician-initiated

and patient-initiated contacts informed the SOPs for virtual consultations that were later adopted within Barts Health NHS Trust (including guidance about patient and clinician expectations about responsiveness to patient-initiated contacts).

In the Hepatobiliary and Pancreatic Cancer Surgery, the initial set-up of virtual consultations was limited to the surgeon's office and established outside usual clinic hours. The focus was on creating a safe space (physically and logistically) that allowed the clinic to test out virtual consultations with a small group of selected patients at specific times and away from the usual clinics. Patients were invited for virtual consultation on the basis that they were receiving good news during a postoperative follow-up (the assumption being that bad news had to be imparted face to face in the clinic), and with no requirement for a physical examination. A total of 12 virtual consultations were undertaken over 18 months, allowing familiarisation with the technology, consideration of logistical issues (primarily around interfacing with established clinics and the use of shared office space) and reflection on the selection of patients to be invited into the service. Over the course of our fieldwork, a decision was made to extend the use of virtual consultations beyond cancer follow-up to include other appointments within the Hepatobiliary and Pancreatic Cancer Surgery service, to integrate the virtual consultation option within the usual morning clinic and (having now gained good experience of the technology and its use with patients in a clinical context) for the nurse to take a lead on virtual consultations (with the consultant available if needed). This work is under way as part of the wider roll-out of virtual consultations at the trust.

As set out above (see *Virtual consultations in the Antenatal Diabetes service*), virtual consultations were initially thought to be a good idea for the Antenatal Diabetes service, which is a busy clinic, requiring frequent patient contact and average appointment times of 8 minutes. As with the Hepatobiliary and Pancreatic Cancer Surgery clinic, the nurse consultant initially invited follow-up patients to virtual consultations outside the usual clinic time of Friday morning and, instead, during a dedicated session on Tuesday afternoons. In part this was to allow a dedicated time to test out virtual consultations, but was also the only time when the clinician's shared office was known to be empty. The consultant saw around 10 patients between one and three times each (a total of 24 virtual consultations) over a 6-month period. As reported above, given the low proportion of virtual consultations after this time, it was felt that additional time should not be invested, and the service was discontinued.

The initial piloting work of virtual consultation services outlined above was (at least in part) facilitated by a locally agreed tariff for virtual consultations that was equivalent to a face-to-face consultation, thereby enabling some slack within the system to support potential innovation in service delivery. However, as Barts Health NHS Trust has sought to scale up virtual consultation services beyond the clinics included within the study, commissioners have become interested in revisiting the local tariff.

Trust policy and service-level agreements

The implementation and sustained use of virtual consultations in participating services at Barts Health NHS Trust required the development of technical support and IG protocols. This was attributable to the impact of the use of (in this case) Skype software on the trust's technical

infrastructure and the legal, regulatory and local policy issues relating to the protection of patient data, privacy and consent. A major challenge has been to address the lack of consensus on these issues (both locally and nationally).

In relation to technical support, and in line with local policy in most NHS trusts, Barts Health NHS Trust policy states that new software downloads must be performed by ICT staff and requested through the IT helpdesk as standard procedure. During project setup, however, and despite the VOCAL study including both the CCIO and the estates and facilities manager as co-signatories, we found that ICT staff simply did not respond to such requests when they related to the installation of Skype (which was not routinely provided on trust computers). This was attributable to the absence of trust policy and service-level agreements in relation to supporting Skype on NHS computers (and, thus, a mismatch between what had been offered in the research bid and what was de facto supported on the ground). The original piloting of Skype in the diabetes service had been achieved through 'informal' requests to install Skype on a handful of computers in a single clinic.

Following considerable negotiation from the research team and clinicians in participating services, a 'bespoke' agreement was established, in which requests to install Skype on additional computers were to be made directly to a designated ICT manager, who would then arrange for the downloads to be completed. The implementation of this arrangement took 2 months. The need for what might be called a workaround at such an early stage in the project was perhaps telling, and almost certainly reflects the extreme pressure under which the ICT department was operating at the time. Our interviews with local ICT staff and managers strongly suggest that, although they were comfortable with virtual consultations being undertaken via Skype as a small 'demonstration' project by a clinician with whom they were on first-name terms, they feared that extending the option to download Skype (or similar media) on any trust computer would 'open the floodgates' to requests for technical support at a time when they were only just managing to meet existing demand.

The action research component of the VOCAL study sought to establish how technical support for virtual consultations could be provided across Barts Health NHS Trust in the long term. Notwithstanding the short-term workaround described above, a mainstream trust policy on virtual consultations using Skype needed to be established in collaboration with the IG and ICT departments. Working with service managers and the Barts Health IG Manager, the research team produced an internal policy document, covering issues relevant to IG in relation to virtual consultations and SOPs on technical support. The draft document, which was based on the setting up and running of the Skype service within the diabetes clinic and took 2 months to develop, was then reviewed by representatives across key departments, took 9 months to gain formal approval and become trust policy, and has since been continually adapted. Establishing formal agreements with the ICT department, and the views of their staff on the impact of virtual media, such as Skype, on the service infrastructure proved to be key to both setting up the virtual consultations in our participating services and subsequently addressing wider roll-out across the trust. The approved document was subsequently made available to all departments via the trust intranet.

At the outset of this study, the need for a formal, written agreement with the ICT department and a formal Barts Health NHS Trust policy on virtual consultations more generally was not anticipated to be a rate-limiting step, either by the research team or by participating clinical

teams. In retrospect, however, this document can be seen as what Latour would call an 'immutable mobile'[225] – that is, an artefact describing 'the way things are' that is accepted by all key actors, and which serves to stabilise what would otherwise be a highly unstable arrangement of people and technologies.[226] Immutable mobiles include maps, diagrams, graphs and lists of agreed procedures that move within a network and its nodal points of passage, but which retain the same essential properties in different contexts, thereby allowing relations to be performed in the same way in a variety of different settings and locations.

In relation to IG, local implementation was held back by both local and national concerns about the security of virtual consultations in general, and Skype consultations in particular. This concern relates to the security of data streams (the hypothetical risk of someone eavesdropping on calls or accessing messages sent through Skype) and account security (access to information saved on computers). As part of the action research element of this study, the research team worked with participating clinical services and IG teams at Barts Health NHS Trust, with the support of an IG specialist within the local CCG, to identify models of best practice and establish IG policy on the use of Skype within the trust.

As part of the collaborative work with the IG team, we undertook a review of Skype security, which found that the encryption meets the minimum NHS network requirements. Many other virtual media applications (e.g. FaceTime) also meet such criteria. However, it is important to highlight that alternative voice-over-internet protocol (VoIP) systems (a group of technologies for the delivery of voice communications over the internet), some of which are currently being considered by Barts Health NHS Trust and other NHS trusts as alternatives to Skype, would need to undergo similar reviews on their data security.

In relation to account security, our ethnographic fieldwork informed the development of a guiding document for clinic staff to minimise risk to patient privacy and confidentiality. That guidance has been included in the internal SOP document. In addition, we have produced a summary document for wider dissemination to other NHS trusts. This has been reviewed and endorsed by the UK IGA, which used it as the starting point for developing national policy guidelines on the use of Skype and FaceTime across the NHS.

New clinical roles and practices: triage, technical support and direct access

It was evident from our interviews and ethnographic observations that clinicians involved in virtual consultations took on new roles and practices in relation to patient triage (judging a patient's suitability for virtual consultation), patient setup (ensuring that the technology worked, and supporting patients with its use) and medical documentation (changing how electronic and paper documents and other artefacts were used in consultations).

In relation to patient triage, there were no formal criteria in any specialty on how to assess patient suitability for virtual consultations. It was clear that such decisions were made by the clinician on a case-by-case basis, informed by a range of factors that varied across the different clinical contexts. Within the Adult/Young Adult Diabetes clinic, such decisions were discussed and mutually agreed between the clinician and patient, depending on the patient's support needs and wishes. The reality was that most patients (although not necessarily most appointments) were considered eligible for the virtual option.

Within the Antenatal Diabetes Clinic, offering virtual consultations was thought to be considerably more risky, and there were two patients (mother and fetus) to consider. Although moderate perturbations in blood glucose levels would likely cause little harm to the mother, serious complications (e.g. congenital abnormalities, intrauterine death) were possible in the fetus. Furthermore, resistance to insulin tends to increase as pregnancy progresses, necessitating up-titration of the insulin dose, sometimes on a daily basis. Owing to the complexity and risk involved in this clinical context, the option for a virtual consultation was offered only to patients considered to have relatively stable blood sugar readings and the capacity to self-manage effectively. Furthermore, because the clinical picture can change on an almost daily basis, close familiarity with the patient's history and background appeared to be crucial, especially since the virtual encounter was undertaken in the absence of a full medical record (since the patient held that record). This is illustrated by the following quotation from the consultant:

I always find when I have a patient who I haven't really got under the skin of. So let's say it's a lady who has gestational diabetes, diagnosed at 28 weeks and I've met her at 32 weeks for literally less than 5 minutes, and I might have thought well sugars are all fine: 'We'll see you for a scan in 4 weeks, why don't you Skype at 2 weeks?' I've had a few of those because I think they're all fine. That Skype appointment to me is terrifying because I then get my orange bit of paper. There's not much information on it because at the time I wasn't very worried and I've lost that opportunity to go through it again. I think as clinicians, if you can't remember the patient, then you're duty bound to go back and check in your mind that you have got all the information you need. As soon as you don't have the notes, if you can't remember the patient, you might have this orange piece of paper saying all seems fine, why not Skype in 2 weeks. But actually you're just a bit worried. Whereas someone like [patient X, known to consultant], who I'm Skyping three times a week, I mean, I totally get her.

In the Hepatobiliary and Pancreatic Cancer Surgery clinic, virtual consultations were offered to patients for postoperative follow-up if the consultant was confident of the treatment outcome, based on the details of the operation performed and the postoperative CT scan result.

Another aspect of patient triage was confirming that the patient had access to Skype (on a computer or a mobile device) and that they or a family member knew how to use it, since these were prerequisites for inclusion in the study and the trust does not offer technical support for patient-owned technologies. Patients seeking to use the virtual consultation option must establish contact with the clinician's Skype account before a consultation can take place.

As part of the action research for this study, the research team collaborated with clinicians, the IG department and local CCG IG managers to produce a patient leaflet containing information about using Skype and written details of the clinic Skype username/ID (identification). Although patients found this material useful, additional support was often provided by the clinician as part of the setup phase. For instance, prior to a first virtual consultation, the clinician typically contacted the patient (via e-mail or telephone) to confirm their account details, check that they had registered and confirm that a contact invitation had been received. Clinicians sometimes also conducted 'test calls' with patients before their consultation, so that the patient could familiarise themselves with the technology or check that the video and audio worked.

Patients and clinicians often shared documents (e.g. paper medical record) and similar artefacts (such as lists of blood sugar readings) as part of their consultation. The ease (or not) with which

such material exchanges happened was of course influenced by whether the consultation was face to face or virtual; these data are discussed in more detail below in the section on the micro-level findings (see *Chapter 5*).

In relation to the organisational processes associated with material artefacts (e.g. creating or editing them), the introduction of Skype has had little impact within the Adult/Young Adult Diabetes and Hepatobiliary and Pancreatic Cancer Surgery clinics, as all key documents are stored and accessed electronically.

In the Antenatal Diabetes Clinic, however, a paper patient-held maternity record (on which all members of the multidisciplinary team entered data) was used. This was readily shared across the desk in the face-to-face setting, but impossible to share easily in the virtual setting – a restriction that had a considerable impact on how the clinical consultation unfolded, and strongly influenced the triage decision on who was 'suitable' for a virtual consultation. The consultant's perception of risk was also influenced by the fact that the antenatal outpatient clinic was set up to generate additional medical information (collected by additional ancillary staff) to support their clinical assessment. For example, patients' weight, blood pressure and urinary ketone levels are taken on arrival at the clinic, and these data are made available to the clinician along with the hospital and patient-held maternity record. In comparison, the virtual consultation with an antenatal patient was invariably data sparse.

In the Adult/Young Adult Diabetes clinic, the use of virtual consultations facilitated patients' direct access to the clinician, because patients could send a short message service (SMS) message via Skype and/or contact a clinician informally for an ad hoc consultation (this process usually involved the consultant indicating on Skype that they were online and 'not busy', the patient messaging them to ask if they were free and then together arranging a time shortly after to connect). Although it had been known at the outset that this option was technically possible, neither the clinicians nor the research team had anticipated how this function would be repurposed by patients to bypass the appointment system and establish a direct communication channel with their doctor or nurse. This ad hoc part of the service was used by some patients to contact the clinician between their scheduled appointments to ask questions or raise concerns. This 'open access' aspect of the service was welcomed by the Diabetes team because it aligned with the clinic's goals to enhance patient self-management and engagement (as noted in *Virtual consultations in the Adult/Young Adult Diabetes service*, the virtual consultation service had originally been established to solve the problem of a high DNA rate in patients who were typically from socioeconomically deprived and/or minority ethnic groups). Dealing with such messages and the ad hoc requests for an unscheduled Skype call appeared to be practically manageable, because the virtual consultations ran alongside the diabetes outpatient clinic. In contrast, clinicians' access to Skype within the Antenatal Diabetes and Hepatobiliary and Pancreatic Cancer Surgery settings was restricted to specific times (and a narrow time window), which limited their capacity to respond in the same way.

The repurposing of Skype technology to contact clinicians outside scheduled appointments raised challenges in relation to managing patients' expectations (e.g. about when and for what purposes a consultant can be contacted). We noted occasional examples of patients using the Skype messaging service to contact the consultant outside usual hours for non-medical and non-urgent matters, with an apparent expectation of '24/7' service). This also has implications for

clinician workload, reimbursement (see *Chapter 3*, *Rolling out remote consultations*) and medicolegal issues.

Clinic management and administration

Embedding virtual consultations in clinic routines was a complex and difficult process that took many months and which was strongly influenced by physical space and the material properties of technologies and artefacts. Our ethnographic data highlight how work practices and the often subtle, but important, social, professional and material contexts in which such work takes place have a bearing on the capacity to embed the technology in routine practice.

This process of embedding virtual consultations is presented in *Figures 3–8*, which map out the human and technical interactions and interdependencies on which the execution of both face-to-face and Skype consultations depended in the Adult/Young Adult Diabetes clinic (see *Figures 3* and *4*), the Antenatal Diabetes Clinic (see *Figures 5* and *6*), and the Hepatobiliary and Pancreatic Cancer Surgery clinic (see *Figures 7* and *8*). Drawing on Feldman's notion of 'organisational routine'[142,167] – defined as 'a repetitive, recognizable pattern of interdependent actions, involving multiple actors'[159] – we explored how face-to-face and virtual consultations were enacted, purposefully capturing the complex (and very different) actions involved in trying to make face-to-face and virtual consultations happen in different clinical and material contexts. In contrast to the protocols ('proxy routines'[167]) and descriptions of staff ('ostensive routine'[167]) across Barts Health NHS Trust, these observed instances of consultations (referred to by Feldman as 'performative routines'[167]) enabled us to identify the social and organisational factors shaping the ways in which clinics sought to embed the Skype technology and virtual consultation services over time. It also allowed us to tease out the logistical and practical aspects of clinic work, and the technologies and artefacts supporting it, that facilitated the use (or non-use) of the technology within particular clinical contexts.

FIGURE 8

The routine for a virtual consultation in the Cancer Surgery clinic. ID, identification.

FIGURE 5

The routine for a face-to-face consultation in the Antenatal Diabetes Clinic. ID, identification.
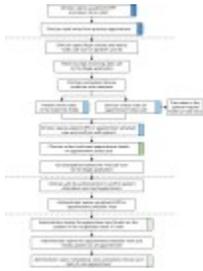
FIGURE 6

The routine for a virtual consultation in the Antenatal Diabetes Clinic. ID, identification.
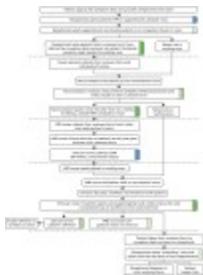

FIGURE 7

The routine for a face-to-face consultation in the Cancer Surgery clinic.

The work involved in embedding face-to-face and virtual consultations in clinic work broadly related to four key processes or subroutines: generating data/information (highlighted in light blue in *Figures 3–8*), enabling access to data/information (highlighted in blue), facilitating patient access through the clinic (highlighted in green), and tracking the patient through the clinic/care pathway (highlighted pale green). Crucially, as we come on to discuss below, each of these processes was supported by technical and material artefacts, the movement of artefacts across the (virtual and physical) spaces of the clinic/hospital and the role of multiple clinical and non-clinical actors.

As is visible in *Figures 3–8*, the introduction of virtual consultations significantly affected the ways in which consultations were undertaken across the three clinics. The physical presence of the patient within the clinic setting was fundamental to existing ways of identifying, scheduling, conducting, rebooking and monitoring patient appointments. For instance, in *Figure 7* the physical presence of the patient at reception prompts 'check in' and generation of the clinic outcome form; this enables the nurse assistant to identify the patient, conduct the relevant tests and record the results on the form, which in turn enables the remainder of the consultation to take place. Embedding virtual consultations within existing services involved significant reworking of those processes in ways that accounted for the 'virtual' presence of the patient. The extent to which existing face-to-face consultation routines needed to be reoriented, and the ways in which this was managed by staff varied across the three clinic settings depending on the people, technologies, material artefacts, physical and spatial arrangements, clinical pathways and assessment procedures already in place. As we set out in the remainder of this section, this meant

great variation in how the Skype technology and virtual consultation service were (and were not) embedded in clinics.

Work routines across the three clinics were adapted to align the Skype technology and virtual consultation service with existing roles, processes and structures. This included processes and structures related to EPR management, appointment scheduling and recording attendance. These routines and structures vary across different clinics, and so staff have collectively evolved their own roles and workarounds within their local settings.

At the outset of the study, the Cerner EPR system was used across the Barts Health NHS Trust clinic as a shared scheduling tool to book appointments and indicate when the patient had arrived at the clinic and attended their appointment. The EPR system continued to be used throughout the study in both the Antenatal Diabetes and Hepatobiliary and Pancreatic Cancer Surgery clinics, providing a facility for auditing, service management and acting as a commissioning resource. It therefore needs to accurately reflect staff time and activity (including appointment type, frequency and durations).

In the Antenatal Diabetes clinic, the EPR was used to access medical information (stage of pregnancy, type of diabetes, blood results) and confirm upcoming appointments. However, in this context, the majority of clinic data were documented and reviewed using the maternity folder held by the patient. In the Cancer Surgery context, the EPR was used to review blood test results and CT scans as part of the patient's cancer treatment review, and to review previous GP letters generated and stored through the system.

Within the Adult/Young Adult Diabetes service, the Cerner EPR system was used at the outset of the study to review previous appointments with the consultant (via GP letters generated and stored through the system), blood/urine results (for annual review) and clinical outcomes from other clinical departments. This was used in conjunction with the Diamond diabetes management system (used by the diabetes nurse specialists to document blood sugar readings and free-text documentation of the consultation discussion), hospital notes (with past medical history not documented electronically) and pre-appointment weight and blood pressure measurements (obtained on arrival at the clinic). Towards the end of the study, a new system (EMIS) was introduced for recording nurse consultations, leading to subtle but important disruption to the virtual consultation routine – and, in particular, to difficulties in recording (in the form of coded data) that a virtual consultation had taken place (see *Overview of virtual consultations in Diabetes and Cancer Surgery services* above). A key challenge to the introduction of virtual consultations at Barts Health NHS Trust was the reconfiguration of the EPR system to allow the booking of 'webcam follow-up' appointments on the clinic appointment schedules. Each consultant has an EPR 'profile' through which appointments are booked by the administration teams. The available appointment types and time slots that can be booked are configured according to their existing clinic schedule. The introduction of the 'webcam appointments' in any clinical service involved a lengthy process of form filling, enquiries (by e-mail/telephone) and discussions and agreements among senior service managers. Prior to the VOCAL study, EPR configurations were implemented by the administrative teams within the particular clinical service. However, changes in organisational structures meant that the EPR had become managed centrally by the trust's ICT department. Consequently, the reconfiguration of EPR for the implementation of Skype required new formal procedures, forms and authorisations that had not previously been required when EPR was managed within the clinics (where clinical and EPR

management staff knew and routinely worked with each other and had a culture of collaborative troubleshooting and mutual support).

The designation of virtual consultation appointment slots needed to be aligned with existing appointment schedules, clinician availability, and clinic and office space. As noted above, these routines and structures varied across the different clinics, and so staff developed their own scheduling times and processes for virtual consultations. Within the Adult/Young Adult Diabetes service, virtual consultations were conducted alongside the outpatient clinic. This was possible because the clinic and administrative staff within the service occupied their own office and clinic space, enabling them to access Skype during the usual clinic hours. The virtual consultation service became embedded in the work of the clinic, so staff and patients repurposed the technology to enable a more flexible approach that involved more ad hoc consultations that did not require formal booking. In contrast, the outpatient clinic spaces for Antenatal Diabetes and Hepatobiliary and Pancreatic Cancer Surgery were shared with other departments and located separately from the clinicians' offices. This meant that specific times and locations had to be established for Skype appointments. In addition, in the Hepatobiliary and Pancreatic Cancer Surgery, the booking of patient appointments required a high level of flexibility, as so much depended on postoperative recovery of individual patients and test results (e.g. from CT scans or blood tests). It was crucial to maintain this flexibility with the introduction of the virtual consultation service; hence, the nurse booked patients into face-to-face appointments (via the routine set out in *Figure 7*) and then offered the Skype option by telephone when the test results had been received. This created an additional layer of work, requiring the nurse to schedule both a face-to-face and a virtual consultation, and then cancel the face-to-face appointment once the virtual consultation had taken place.

It was necessary to change the process of documenting appointment attendance to accommodate virtual consultations. In face-to-face consultations in the Adult/Young Adult Diabetes clinic (see *Figure 3*), patient attendance to the outpatient clinic was routinely recorded by the receptionist at the clinic entrance when the patient physically appeared, which, in turn, prompted the nurse assistant to obtain the patient's hospital record and clinic outcome form for pre-appointment medical checks – events that did not happen in virtual consultations. Instead, the 'usual' receptionist role was effectively bypassed (see *Figure 4*), and clinicians took on the role of ensuring that attendance was accurately documented; the consultant walked to the reception desk after the clinic to report on who had 'attended', providing the clinic outcome form (which is usually completed by hand by the consultant to indicate the next appointment and handed in to reception by the patient on their departure, i.e. exactly the same information as required for a face-to-face consultation by a different routine) for the receptionist to input onto the patient's records and book future appointments. In the virtual consultation service, the receptionist effectively checks the patient 'in' and 'out' in the same step as booking the next appointment. This routine was additionally supported by a new role for the nurse assistant, who collated the hospital records of the patients scheduled for a Skype consultation and simply placed them on the clinician's desk at the start of each clinic, with a handwritten note on the top saying 'Webcam'.

In the Antenatal Diabetes clinic, the receptionist role of checking the patient in and directing them through to the first of several pre-appointment checks (see *Figure 5*) was similarly bypassed. Instead, the consultant contacted the service administrator by telephone following the virtual consultation so that the administrator could record the patient's attendance (see *Figure 6*).

In the Hepatobiliary and Pancreatic Cancer Surgery clinic, the nurse accessed the EPR system directly after the Skype consultation in order to check the patient in and immediately out again (see *Figure 8*), before the consultant then sent relevant documentation to administrative staff via e-mail. In all cases, recording attendance in the face-to-face clinic was considerably easier and quicker than doing so in the virtual clinic. However, there was more parallel work at the time of face-to-face consultations to generate, exchange and physically move patient data and material artefacts (the clinic outcome form, the EPR and so on) in ways that enabled the legitimate transfer of the patient from one place to the next.

A major concern when seeking to embed virtual consultations in administrative and clinical routines was the absence of recent and accurate medical information, obtained through the pre-appointment checks and the comprehensive maternity notes used across the other clinical departments treating the patient. Take the following example from a consultant in the Antenatal Diabetes clinic:

So I feel much more vulnerable, in terms of not having all their records there. Not picking up on things that may have happened to the patient . . . You can see [on the patient-held maternity record] if they have seen another professional. OK you can ask someone on Skype, but, what I have discovered is that people will not tell you, which is reasonable, something they think you are not interested in.

In face-to-face consultations in the Antenatal Diabetes clinic, the consultation is dependent upon the patient-held maternity folder, which records, for instance, blood sugar readings, insulin doses and pre-appointment checks, such as blood pressure, weight or urine ketones. This information is not routinely replicated in the hospital or EPRs. Hence, virtual consultations take place in the absence of a full medical record, and were a particular challenge when the clinician did not have an established relationship with the patient (as, for instance, with many of the patients being seen for gestational diabetes). As one of the Antenatal Diabetes consultants neatly put it:

I think the problem is, whereas with most diabetes clinics you get to know the patients fairly well, often the name and when you see the notes, you recollect them. The antenatal patient is different. They may see me once. It would be a brief, superficial appointment, rather than someone seen for the last 10 years. Because we see so many patients, I don't have that confidence that I know the patient prior to seeing them on the Skype screen . . . And its affected by patients being so huge number, and some will only be under our care for about 6 weeks.

As the detailed maps of organisational routines in *Figures 4*, *6* and *8* highlight, staff developed workarounds and performed 'hidden work' to support the safe delivery of clinical care in the remote environment and ensure that all key aspects of the interaction were adequately recorded. They found pragmatic solutions to practical problems, such as generating their own 'temporary notes' (as with the handwritten 'Webcam' note referred to above) and assuming responsibility for aligning these with the main EPR, as described here:

So what I have been doing with Skype patients is writing myself brief notes on this and holding them here, with view to file in the hospital notes when pregnancy has concluded. This becomes part of hospital records.

Antenatal Diabetes Consultant

This development of knowledge and practice required ongoing adaptation and resolution. For instance, considerable additional time and effort was involved in reconfiguring technical systems to accommodate 'webcam' appointments. In the Antenatal Diabetes clinic, in particular, the lack of 'organisational slack' – limited resources, fixed protocols and distributed roles and responsibilities – was a major barrier to the collaborative and adaptive efforts needed to embed virtual consultations as business as usual.

Resourcing and managing the roll-out of virtual consultations

Following the insights from our meso-level ethnography and interviews, a trust-wide decision was made to establish a cross-departmental working group to assist with overcoming the numerous practical, technical and operational barriers to the smooth and efficient use of Skype for virtual consultations. This came on the back of the publication of TST,[158] which set out a significant programme of improvement within Barts Health NHS Trust and with relevant health and social care agencies (see *Chapter 2*, *Setting and context*). TST is concerned with radically redesigning services, including outpatient pathways, and includes plans to speed up access to specialist advice via traditional face-to-face services, as well as the roll-out of virtual consultations. The VOCAL study came at a time when senior management at the trust was turning its attention to roll-out beyond a handful of clinics. This senior level buy-in was crucial to moving that work forward, and to establishing an outpatient project strategy group (chaired by the chief medical officer) focused on the roll-out of remote consultations beyond those Diabetes and Cancer Surgery clinics included in the VOCAL study:

And [the director of operations] was saying to me, 'Look, we've got buy-in from the chief medical officer, and from the director of strategy. They want to see this happen.' And so we sort of talked about who are the kind of key people who we need to involve. And came up with a cast list of individuals that we need to get on board with this. So really it was ICT, who are really important, finance, outpatients – as in the core service – and then each of the sites. So we, we wanted to have kind of a senior lead from each of, each of the sites, to actually drive it forward.

Programme Lead

The outpatient project strategy group (see *Action research*) was initially focused on supporting the three services in the study, but later extended its remit to include the wider roll-out of virtual consultations across outpatient services. Initially, the roll-out focused on developing virtual consultation services in neurology, rheumatology, haematology and endocrinology, with plans in place to extend this to include cardiology (inherited arrhythmia), urology, lipid clinics and diabetes community services. The work undertaken in the diabetes service since 2011 has been crucial in highlighting the complex challenges of embedding virtual consultation services within routine practice at Barts Health NHS Trust. Ongoing input from the diabetes consultant and programme lead, arguably 'telehealth champions',[227] also played a role in promoting and legitimating virtual consultations as 'business as usual' within the trust and building key relationships.

Collaboration across clinics and staff at Barts Health NHS Trust and the sharing of knowledge and practices have been critical to the development of virtual consultation services to date. Local teams worked collaboratively with one another (e.g. in working through business cases, SOPs

and clinical pathways, as they sought to pilot and then embed virtual consultation services, or in identifying unused space that might be used for private Skype clinics), taking account of the need to ensure patient safety and clinical appropriateness, co-evolve the introduction of new technologies and the development of new team roles and processes, and address IG issues and concerns.

The roll-out has also needed to accommodate competing policy priorities locally and nationally, working with national policy-makers, regulators and industry partners to find workable ways forward through close dialogue and practical problem-solving. In practice, this has required cross-departmental collaborations with a number of external partners, including the IGA and NHS England (IG), CCGs (local tariff and outpatient process) and Microsoft UK (providers of technology). For instance, as part of the action research in the VOCAL study, Barts Health NHS Trust has also been working closely with Microsoft to test various options for virtual consultations, while providing the technology provider with the information required to produce more patient- and health-care-friendly tools.

Other departments in the trust have now commenced virtual consultations with apparent success. Progress has been varied, with some 'moving faster than others', often driven along by 'clinicians who are really passionate, and driving it, and they want to see it happen' [programme lead]. Formal evaluation of this wider roll-out is soon to commence.