

Chapter 2: Methods

Study design

In contrast to much of the published research literature described in the previous chapter, which has tended to compare ‘technology on’ with ‘technology off’ in an experimental or quasi-experimental design, the design of our study was oriented to teasing out the (often subtle) social and material interactions occurring between patient, staff member and technology(ies). Although experimental studies have their place, technology-focused approaches are crude and deterministic.^{81,132–136} In-depth qualitative studies can reveal how individual identity, experience, expectations and material skill might shape and alter these technology-mediated interactions and make them more (or less) efficient and effective.¹³⁷

We conducted a multilevel mixed-methods study of virtual consultations with macro-, meso- and micro-level components. At the macro level, we combined interviews with 12 national policy-makers and other key stakeholders with analysis of national-level policy documents in order to explore barriers and incentives to, and facilitators of, supporting virtual consultations. At the meso level, we mapped the administrative and clinical processes that needed to change to embed online consultations [e.g. changes to clinical pathways, changes to staff roles, rethinking the use of traditional outpatient space, updating information governance (IG)]. At the micro level, we studied interactional dynamics by generating a multimodal data set (audio transcript, video and computer screen capture) of 30 virtual consultations in Diabetes and Cancer Surgery, alongside a matched data set of 17 (audio-recorded) face-to-face consultations.

Changes to the study protocol

In our original study protocol, we proposed collecting 30–45 virtual consultations between patients and clinicians in Diabetes and Cancer Surgery (10–15 in Cancer Surgery and 20–30 in Diabetes) and then, using fine-tuned linguistic techniques, examining the detail of the interaction. As we began to analyse these micro-level data and examine the interactional dynamics, we quickly realised that it would be helpful to compare these with usual care (i.e. traditional face-to-face consultations) and examine if/where any interactional differences occur. We therefore adapted our study design and protocol to incorporate a comparable sample of face-to-face consultations in Diabetes and Cancer Surgery, audio-recorded to enable analysis of the type of talk that takes place. We used the Roter interaction analysis system (RIAS) to compare different categories of talk in face-to-face and virtual consultations. As we found few significant differences in communication practices (see [Chapters 5](#) and [6](#)), we limited our proposals to minimise suboptimal communicative practices (objective 3) in the guidance for patients and providers on using Skype and similar virtual media for remote consultations (see Practitioner

Resources on the NIHR Journals Library
website: www.journalslibrary.nihr.ac.uk/programmes/hsdr/135926/#/).

Theoretical approach

Our study drew on strong structuration theory (SST),^{138,139} which sees society (through rules, values and norms) as profoundly shaping human behaviour, and human behaviour (through peoples' interpretations and choices, as well as technology-mediated actions), in turn, changing society.

As we have set out in previous work,^{67,139,140} structuration theory links the macro of the social environment (social structures) with the micro of human action (agency) and considers how the relationship between structure and agency changes over time.¹⁴¹ The structure–agency link is mediated through ‘scripts’ (patterns of behaviour and interaction in social settings, including the adoption and adaptation of particular technologies), which gradually change over time.¹³⁷ Scripts link to organisational routines and, hence, to the potential for innovations to become embedded and routinised in everyday practice.¹⁴²

Strong structuration theory proposes that external social structures (social norms, rules and so on) are mediated largely through position-practices (defined as a social position and associated identity and practices), together with the network of social relations that recognise and support it (‘position–practice relations’, of which the clinician–patient relationship is a good example). It also sees human agency as crucial to engaging with technologies.¹⁴³ Within the VOCAL study, SST therefore offered the potential to theorise human characteristics, such as identity and social role (e.g. what it means to be a ‘clinician’, ‘carer’ or ‘patient’), interpersonal relationships (e.g. the clinician–patient relationship), situational knowledge (e.g. patient expectations of a consultation) and the capabilities needed to operate technology.

Four components of SST guided our thinking and analysis of virtual consultations in the VOCAL study: external structures, internal structures, actions and outcomes (*Figure 1*).



FIGURE 1

Strong structuration theory, adapted to encompass a technology dimension. Reprinted from *Social Science & Medicine*, Volume 70, Issue 9, Greenhalgh T and Stones R, Theorising big IT programmes in healthcare: Strong structuration theory meets actor-network ([more...](#))

The first component of SST, ‘external structures’, refers to the position–practice relations that characterise the meso (organisational) and macro (national-level policy and decision-making)

levels, and that change over time (e.g. the ways in which the medical profession is, arguably, less trusted in the face of media reporting about errors).

The second component of SST, 'internal structures', refers to the representations of society that we all have in our heads. They include general dispositions (e.g. discourses and world views, moral principles, attitudes, technical and other embodied skills and personal values – what Bourdieu called 'habitus'¹⁴⁴), as well as specific knowledge of an aspect of the world and how one is expected to act within it (e.g. a nurse's understanding of what is involved in supporting patients with their self-management of diabetes).

The third component of SST is 'activation/active agency'. We used ethnography to study specific examples of interactions – what SST calls 'conjunctures' (the medical consultation is a good example) – to capture how people play out their position-practice relations, behaving in a way that they believe is appropriate and responding in a moment-by-moment way to the other party(ies). To study the agency (i.e. human intention) behind these actions, SST incorporates theories from phenomenology (the study of people's shifting fields and horizons of action arising from the focused activity at hand¹⁴⁵), ethnomethodology (the study of how one person responds, moment by moment, to the talk and action of another¹⁴⁶) and symbolic interactionism (the study of the subjective meaning and interpretation of human behaviour¹⁴⁷).

The health-care setting is heavily institutionalised, and behaviour is often ritualised (i.e. we know, and play out, the roles expected of us as doctors, patients and so on). Behaviour in the consultation is strongly influenced by such things as regulations and other governance measures, norms, beliefs, professional and lay codes of practice and deeply held traditions (all of which are embodied and reproduced by human agents, including clinicians, administrators and patients), rather than exclusively by business concerns, such as efficiency and profit. A person's knowledge of these institutional structures (in SST terms, the 'strategic terrain') may be more or less accurate and more or less adequate. A good example of this might be the older patient who retains the perception that it would be rude to offer suggestions to the doctor, whereas, in reality, the doctor is keen to promote shared decision-making.

The fourth component of SST is outcomes (see [Figure 1](#)). The outcome of human action in the consultation may be intended or unintended, and will feed back on external and internal structures – either preserving them or changing them as they are enacted. A good example of this in our study is whether or not a virtual consultation that is experienced positively will increase the likelihood that the patient will adhere to treatment and attend the next consultation (in person or virtually).

The clinical consultation is a social encounter shaped by social and institutional forces. For instance, clinicians resist technologies that (in their opinion) interfere with good clinical practice and the exercise of professional judgement,⁶⁷ consulting patients will be more or less sick and have socioculturally shaped expectations of being cared for and comforted and their circumstances and/or illness may affect their ability to use the technology (e.g. those consulting virtually may be reliant on a relative or carer at home to access and use the technology). SST enabled us to focus on how bodily, emotional and cognitive functions interact with an individual's disposition, symbolic interpretation and (imperfect) knowledge to affect how the consultation unfolds, and to consider the ways in which wider organisational, institutional and regulatory environments shape interactions in and around virtual consultations.

Action research

Our interests lay in studying the ways in which virtual consultations did (and did not) become embedded in the work of Diabetes and Cancer Surgery clinics. We were therefore keen to work with local managers and commissioners to understand the organisational change required to embed (and potentially spread) the virtual consultation option. Our study was therefore informed by the principles of action research.^{148,149}

Action research has been described as ‘a mutual learning process within which people work together to discover what the issues are, why they exist, and how they might be addressed’.¹⁵⁰ The idea is that practitioners and researchers work together to identify and seek to address issues as they arise in the context of research, and, in this case, in the development of a virtual consultation service. This meant that we keenly responded to requests for input (e.g. regarding issues with loading and updating Skype on clinic computers or plans to spread virtual consultations beyond Diabetes and Cancer Surgery clinics), and judiciously fed back emerging findings to local- and national-level decision-makers whose work was concerned with developing or spreading virtual consultations (e.g. relating to national payment systems).

Below, we summarise the main focus of our action research-related activities across the different levels of the study. Given that a virtual consultation service had already evolved in the Adult/Young Adult Diabetes clinic prior to the start of the study and the focus of Barts Health NHS Trust was on considering the potential for roll-out elsewhere within the organisation, much of our focus was at the organisational level, which appeared to be integral to the ongoing and measured development of virtual consultation services. Although all of our activities were broadly guided by the action research cycle (plan, act, observe, reflect¹⁴⁸) and aimed to feed into service development, our contact with local and national stakeholders provided opportunities for increased insight and our extended fieldwork enabled insights into the complexities of relevant policies, organisational and decision-making processes that would not have been available to us through standard interviews or observations alone.

Macro level: national and wider social context

Our approach to interviewing national-level stakeholders (see *Sampling: macro level*) involved a two-stage process of an initial informal interview with all those identified, followed by in-depth interviews with a subsample of individuals. This provided an important opportunity, not only to collect data for the macro level of the study, but also to engage stakeholders and discuss emerging findings. Discussions typically related to the set-up of virtual consultation services (something that had taken place in the Adult/Young Adult Diabetes clinic prior to the VOCAL study), an overview of organisational activity and a discussion of overall approach and methodology. In several cases (with representatives from industry and NHS England), this led to repeated contact and ongoing discussion about the evolution of virtual consultation services.

The main focus of our work in this area related to national payment systems. In the first year of the study it became clear that there was interest, from within Barts Health NHS Trust and more widely, in extending the (local) spread and (national) scale-up of virtual consultation services.

This was coupled with concerns over the lack of a nationally agreed tariff for virtual consultations (i.e. each service being required to negotiate locally with commissioners as to the cost of a virtual consultation). Although a small tariff existed for a telephone consultation, this was substantially different from that for a face-to-face follow-up, resulting in a significant disincentive for NHS trusts to explore this option. In other words, it made more financial sense to bring someone physically to the clinic for follow-up than to carry this out online and risk, for instance, being paid the equivalent of a telephone consultation.

To explore this further, we met with a representative from pricing development at NHS Improvement (then Monitor, see [Appendix 1](#)), and with colleagues from NHS England, to discuss potential ways forward. It quickly became clear that this was not an issue that we could resolve in the short term. However, we gained an appreciation of the ways in which a new tariff might be established, fed this back to colleagues at Barts Health NHS Trust and, given the limited in-house capacity, we jointly agreed to focus efforts elsewhere in the short term. We subsequently continued to raise the issue of the tariff in discussions with relevant decision-makers and, in partnership with a colleague from NHS England, have since incorporated the issue of national payment into further work (funded by the Health Foundation; see [Chapter 6](#)) that seeks to extend the spread and scale-up of virtual consultations.

Other activities involved meeting with a member of the NHS Chief Executive's team to explore the role of virtual consultations in relation to the development of a new innovation and technology tariff, reviewing the Care Quality Commission's inspection framework for digital health, and feeding into national guidance on IG requirements (see [Meso level: organisational context](#)).

Meso level: organisational context

With virtual consultations already set up in the Adult/Young Adult Diabetes clinic prior to the start of the VOCAL study, a significant amount of work needed to be done at the organisational level to begin working towards virtual consultations becoming 'business as usual' in the trust. In this respect, a significant amount of our action research-related activity focused on the following four areas.

First, following requests from all three clinic teams, we sought workarounds to organisational barriers to developing virtual consultations. For instance, early on in the study, it became apparent that those seeking to use Skype for virtual consultations were experiencing problems in both downloading and upgrading the software. In the Adult/Young Adult Diabetes clinic, team members were unable to perform regular upgrades (required by Skype) and required support from the ICT department, and in the Antenatal Diabetes clinic, the team was unable to gain agreement from the ICT department that they could have Skype on their computers. Formal requests from both teams via the generic ICT support e-mail hit a brick wall. Facilitated by the trust's chief clinical information officer (CCIO), we engaged with the ICT department members directly to explore how their priorities might align with what the clinics were trying to do in providing virtual consultations. A number of issues came to light, including that there was no formal agreement within Barts Health NHS Trust for the use of Skype and, hence, no agreement with the ICT department to support Skype or to respond to related requests, as well as concerns over IG, network capacity to cope with demand for Skype and the potential impact of Skype-related requests on (already stretched) staff time and resources. Taking these concerns into

account, we worked with the ICT department to find a workaround that would enable virtual consultations to run in a handful of clinics. This involved requests for Skype support going directly to a nominated ICT manager, who then passed them on to the relevant person within their team to resolve, and so enabling the development of virtual consultation services in the three clinics participating in the study.

Second, we supported the development of IG guidance. In an effort to address the ICT department members' concerns about IG (see above), we worked with the trust's IG department, which was aware that Skype was beginning to be used, but (at that stage) was unsure of how best to support it. Along with a colleague in one of the local Clinical Commissioning Groups (CCGs; with expertise in IG), we drafted IG guidance, with regular input and clarifications from the Barts Health NHS Trust IG department. The guidance was subsequently approved by Barts Health NHS Trust. In parallel, a member of the VOCAL study steering group connected us with the Information Governance Alliance (IGA; at NHS Digital, formerly the Health and Social Care Information Centre – see [Appendix 1](#)), which we worked with to pool materials, informing the IGA's own guidance and gaining IGA approval for the Barts Health NHS Trust's own guidance.

Third, we sought to develop a community of practice of those interested in, or actively developing, virtual consultations. This largely involved us in linking key individuals, clinical teams and departments within Barts Health NHS Trust, but, as the study progressed, increasingly involved us in linking with external partners (e.g. industry partners, other NHS providers) interested in either supporting or learning more about the work being undertaken at Barts Health NHS Trust. Within the trust, we also proactively set up two consolidating learning workshops involving staff from the Diabetes teams (i.e. Adult/Young Adult and Antenatal clinics) to gather feedback from all those involved in, or impacted by, the virtual consultation model. We chose not to undertake further workshops, as we were welcomed into mainstream governance structures and working groups (see below) and found it helpful to concentrate our efforts there.

Finally, and fourth, a significant proportion of our time was focused on facilitating or unblocking barriers to video conferencing within the three study clinics; however, as the study progressed and the trust became increasingly interested in virtual consultations, so our attention turned to rolling out the service to other departments. Initially, this led us to liaise with members of the trust's senior management team to feed in emerging evidence from the study. We then sought to monitor and support plans to roll out virtual consultation services via two main activities:

1. Establishing an outpatient project strategy group to facilitate dialogue and co-ordinate efforts across different clinics (including endocrinology, haematology and neurology) and other departments involved in setting up and running virtual consultations. This included clinic representatives, ICT and IG and operations and business strategy. The group met monthly to discuss developments and was led by a senior member of the Barts Health NHS Trust operations and strategy department. Members of the VOCAL study team (SV, JM and JW) formed part of the advisory group and provided direct input on developments.
2. Developing guidance and protocol documents (drawing on findings from the VOCAL study) to guide roll-out, including standard operating procedures (SOPs), service set-up protocols and guidance templates (see Practitioner Resources on the NIHR Journals

Library website). These materials were internally approved within the trust, and are routinely used as part of service development.

Micro level: virtual consultations

At the micro level, we were oriented to practical support for virtual consultations facilitated by the presence of a researcher (typically at the patient end) who was able to, for instance, help resolve technical issues with the equipment. Our contact with patients also provided helpful insights into perceptions (and the potential use) of virtual consultation services. We fed such insights back to clinic staff members, who, in turn, shaped and modified their own virtual consultation service accordingly. For instance, in Cancer Surgery, staff had initially assumed that patients needed to come into the clinic for a post-operative follow-up appointment that involved breaking ‘bad news’, and so had selectively invited patients for virtual consultation on the basis that they would receive only ‘good news’ virtually. Patients’ feedback indicated that people would prefer to receive bad news in their own home with their family/carer nearby and without the need for (sometimes extensive) travel before and after their appointment. This led to staff rethinking the basis on which they offered virtual consultations to patients.

Finally, prompted by discussions with the IG department (see [Meso level: organisational context](#) above) about security and privacy, we developed a leaflet summarising what patients can expect from a Skype consultations (see Practitioner Resources on the NIHR Journals Library website).

Project management and governance

The study was delivered by a core working group (TG, SV, JW, JM and SS), supported by a 6-monthly independent steering group and a patient advisory group (PAG; see [Patient and public involvement](#)). The steering group had a lay chairperson and cross-sector stakeholder representation, including patients, NHS stakeholders and national-level decision-makers (see [Appendix 2](#)).

The study received ethics approval from City Road and Hampstead NHS Research Ethics Committee on 9 December 2014 (reference number 14/LO/1883).

In line with changes to the VOCAL study protocol (see [Changes to the study protocol](#)), the following substantial amendments were sought and approved:

- a. substantial amendment 1: audio-recording face-to-face consultations for comparison with Skype consultations; approved on 23 February 2016
- b. substantial amendment 2: sharing selected video recordings (with patient consent) with technology developers to inform and improve the design of remote consulting technology; approved on 1 December 2016.

Patient and public involvement

Patients and their carers have been key to the VOCAL project and, in fact, the original impetus (in 2011) to use virtual consultations was initiated by service users (many from deprived backgrounds and/or minority ethnic groups) within the Diabetes clinic in Newham. At that time, we sought patient feedback as an integral part of both service development and ongoing evaluation (e.g. from focus groups, in-depth telephone surveys and online questionnaires, to refine the intervention in the Diabetes clinic¹⁰).

We set up a dedicated PAG in 2015. The main purpose of the PAG was to continue to incorporate patient feedback within our work and help to capture patients' experiences of both the research process and the proposed virtual consultation services. The group was facilitated by Anna Collard, who has a background in community anthropology. The intention, set out in its terms of reference, was that the PAG would provide advice and feedback to the VOCAL research team and steering group. The intention was that the VOCAL research team and steering group would inform the PAG about research findings as they went along. The focus of the group was on the interactions between the clinician and the patient in Skype consultations, and not on any one particular condition (i.e. either diabetes or cancer). Patients from the PAG were also asked to review key documents, such as patient information leaflets.

Summary of patient advisory group meetings

The PAG was set to meet every 6 months (or four times over 2 years, 2015–17). In the event, the group met three times during the lifetime of the project (one meeting was cancelled, as a mutually convenient date and time could not be found). In place of the formal meeting, a number of members were contacted by the research nurse (DC-R) and asked to provide comments either by telephone or e-mail on a summary update of the VOCAL research that was circulated to them. Following completion of the project in July 2017, we also followed up with one volunteer member of the PAG to discuss key findings and provide tailored input to a lay summary of the study.

At first, patients were recruited directly by clinicians in the Adult/Young Adult Diabetes, Antenatal Diabetes and Hepatobiliary and Pancreatic Cancer Surgery clinics. After that, other approaches were also used to involve patients in the PAG (see [Widening patient involvement](#)).

A total of 12 patients and one spouse attended across the three PAG meetings, with attendance at each meeting ranging from three to nine members, plus facilitators. In one case, a patient with cancer was recruited by snowballing from his son, who had diabetes and had been recruited via the Diabetes clinic. Formal demographic data were not collected on the 12 PAG members, as this was considered intrusive. Participants represented a range of ethnic backgrounds, including South Asian, African Caribbean, sub-Saharan African, white Irish and white British, as well as a wide age range (from recent college leavers to one participant who described himself as being 'in my 80s'). Their experiences as patients included having insulin-treated and tablet-treated diabetes, gestational diabetes and cancer.

One of the PAG meetings was attended by Professor Trisha Greenhalgh, the VOCAL study academic lead, and the final meeting by Joseph Wherton, the VOCAL Research Fellow. Both

updated patients on the VOCAL study and findings to date, answered questions and reported back patient comments and/or queries to the steering group.

Focus of the patient advisory group meetings

In general, each PAG meeting focused on three key issues: (1) the VOCAL study itself, progress and feedback; (2) discussions on the general use of Skype, experiences, advantages and limitations; and (3) developing a wider virtual consultation service and evaluating its strengths and limitations.

In one of the PAG meetings, the group was shown (with the written consent of the patients involved) two video clip recordings of virtual consultations, one as part of a filmed VOCAL consultation and one from a different research study (also led by TG) as the basis for discussion. These two consultations were very different (e.g. one was for antenatal diabetes and one for heart failure; in one, the patient used a personal computer, and in the other, a mobile phone; one was with a doctor and one was with a nurse; and the clinician in each case had a different style).

Two representatives from a Newham-based international charity to address female genital mutilation (FGM) were invited by our patient participants to attend their group on one occasion. They shared their experiences of setting up and using a Skype service to provide remote counselling to women and girls who had experienced (or were at risk of) FGM. Common issues included the use of the Skype medium for discussion of sensitive issues, privacy and security concerns, and the technical and practical challenges of establishing and maintaining contact when the end-user may be unfamiliar with the technology. Overall, these experienced users of Skype for FGM support were positive about its benefits, reassuring about the discussion of sensitive topics and able to describe to our patient group how potential practical and technical challenges could be creatively overcome.

In the final PAG meeting, patients were asked to comment on a patient leaflet designed to introduce patients to Skype use for appointments.

Widening patient involvement

As reported, it proved to be difficult to sustain patient engagement in the PAG, in part, because of the reliance early on in the study on referrals to the PAG from clinicians. As a result of the difficulties, different approaches to engaging patients in discussions about the VOCAL study were explored in an effort to incorporate a wider set of views that went beyond 'self-selecting' patients. Approaches used included a visit to a prenatal diabetes education session, which nine mothers and one spouse attended. As part of the wider appeal, the PAG facilitators were also in touch with a number of other patient groups for feedback on the VOCAL study. These included one group promoting peer support for younger people with diabetes, and another working to prevent mothers with gestational diabetes developing type 2 diabetes. In addition, a voluntary sector group providing support to patients with cancer was contacted. The October 2016 PAG meeting was also publicised through the local Healthwatch newsletter.

In addition to the PAG, the VOCAL steering group had an independent lay chairperson and included one patient representative (see [Appendix 2](#)). The patient representative was not a member of the PAG.

Summary of comments from the patient advisory group

The PAG members had diverse views on many aspects of the study. Three areas of strong agreement among the PAG members were striking, however. The first was that Skype consultations were not, and should never be, a replacement for traditional face-to-face consultations. The second was that if Skype consultations were offered, they should be offered to all patients attending the clinic and not just to ‘selected’ ones. The PAG influenced our thinking in this regard: although clinicians felt that it was their duty and prerogative to ‘select’ patients to be offered the Skype option, the PAG was of the view that it was the patient’s ‘right’ to have the option of a Skype consultation. Patients did, however, consider that the potential benefits of virtual consultations were dependent on the type of consultation (i.e. what it is for), the level of familiarity between patient and clinician, and the link with test results (with receiving routine blood test results in particular being perceived to lend itself to online contact). The third was that there were few (if any) concerns about security and confidentiality, with virtual consultations assumed to be as confidential and secure as face-to-face and telephone consultations. Some patients also felt that they were a potential resource to support the evolution of virtual consultation services, by providing ‘Skype training’ to other patients who are not familiar with its use.

Setting and context

We have been working for several years with the front-line clinical team in the Diabetes clinic to develop virtual consulting as part of business as usual in Barts Health NHS Trust, the UK’s largest acute trust (formed in 2012 when three trusts in different boroughs merged).

We studied three clinics on different sites: Diabetes (Adult/Young Adult), based at Newham hospital and with a community outreach clinic in a local general practitioner (GP) surgery (Shrewsbury Road), the Antenatal Diabetes service based at Mile End Hospital and the Hepatobiliary and Pancreatic Cancer Surgery service at the Royal London Hospital. These sites are located across adjacent London boroughs (Newham and Tower Hamlets), both of which are characterised by a high level of socioeconomic deprivation, ethnic and linguistic diversity, and a high burden of disease.^{151,152} Like many acute trusts, Barts Health NHS Trust is under pressure to deliver services more cost-effectively, while responding to rising need and demand.^{153,154}

At the time of our study, the national health-care landscape was characterised by significant financial pressure, with NHS organisations struggling in the face of constrained budgets and growing demand, and technology being seen as a logical route towards achieving cost-savings and increasing quality. This national picture was mirrored in Barts Health NHS Trust, where remote consultation services in the Diabetes clinic and Cancer Surgery evolved in the context of considerable financial, organisational and staff pressures.^{153,155} Barts Health NHS Trust serves a

population of around 2.5 million in east London, with around 2000 clinics across eight different locations, over 15,000 staff and an annual turnover of £1.4B. In 2015, Barts Health NHS Trust was rated as ‘inadequate’ by the Care Quality Commission (the independent regulator of health and social care in England; see [Appendix 1](#)), with significant concerns reported in safety, effectiveness and responsiveness, and with the leadership of the trust.¹⁵⁶ The trust was also put into ‘special measures’ (a set of measures applied to NHS bodies with a view to resetting expectations of financial discipline and performance) in September 2016, following substantial and mounting financial deficits.¹⁵⁷ It is against this background that Barts Health NHS Trust set out a significant programme of improvement, both within the trust and with the relevant health and social care agencies (commissioners and providers), called *Transforming Services Together: Strategy and Investment Case* (TST).¹⁵⁸ The focus of TST is on radically changing the way in which services are designed and delivered, and this has fed into subsequent sustainability and transformation plans (see [Appendix 1](#) for an overview). This includes the redesign of outpatient pathways, enabling quicker access to specialist advice, both virtually and face to face. As part of this work, and in line with the national-level impetus for technology-enabled care, Barts Health NHS Trust established an outpatient project strategy group (see [Action research](#)) focused on the potential roll-out of virtual consultations beyond those Diabetes and Cancer Surgery clinics included within the VOCAL study.

Adult/Young Adult Diabetes Services

The Adult/Young Adult Diabetes service has a long tradition of applied research and quality improvement activity aimed at ensuring that services are accessible, culturally congruent and oriented to meeting the needs of the most vulnerable patients (e.g. limited English speakers with low health literacy). A key component of this work has been developing links with local GPs and deploying specialist nurses and bilingual health advocates in community outreach roles.

Unusually, a high proportion of patients with diabetes in this catchment area are young. Newham has one of the youngest populations in the UK, and the UK’s highest prevalence of type 2 diabetes in the 16- to 25-year age group (0.57/1000), attributable to a combination of risk factors (e.g. poverty, ethnicity, diet).

Engagement with traditional health service models is typically low, with poor health outcomes (e.g. young adults with poorly controlled diabetes have an increased risk of sight-threatening retinopathy and adverse pregnancy outcomes) and increased use of unplanned care through the A&E department. At the time of our study, outpatient consultations via Skype for patients who choose this option were already an integral part of the service.

The Adult/Young Adult Diabetes service is an integrated community diabetes service, in which the consultants provide 6-monthly reviews of the patient’s condition, treatment and medication, with ongoing support from diabetes nurse specialists (from a partnering trust, the East London NHS Foundation Trust). The Adult/Young Adult Diabetes clinic is led by a diabetologist, who runs two weekly clinics on a Monday and Wednesday morning. The appointments are run for young adults (aged 16–26 years), adults and patients with insulin pumps. The diabetologist works closely with five other diabetes consultants running separate clinics, including Adult General Diabetes, a foot clinic and antenatal care. The lead diabetologist offers virtual

consultations to all her adult and young adult patients as an alternative to follow-up appointments. She would typically conduct 40–50 follow-up appointments per month (i.e. virtual and face-to-face consultations), with each appointment lasting up to 30 minutes.

At each clinic, the consultants are supported by a nurse assistant who conducts the pre-appointment medical tests and checks (weight, blood pressure and recent eye test results), adds these to the patient's clinic outcome form and provides this to the consultant (along with the patient's hospital notes) to support the consultation. The nurse assistant also plays a key role in helping to co-ordinate the running of the clinic, by informing the consultant when the patient is ready to be called in for their consultation (by placing the patient's medical notes and outcome form on the clinician's desk after the pre-appointment checks) and bringing any remaining medical files for DNA appointments to the clinician at the end of the clinic.

There are six nurses in total: three running appointments with young adults and three with adults who also offer a diabetes pre-pregnancy service. The virtual consultation option is offered by the nurses supporting young adults. They work with the same patients, with one nurse specialising in supporting those with insulin pumps. The nurses provide diabetes management support, including adjustments to insulin doses, diet review/management and education on the 'DAFNE' (Dose Adjustment For Normal Eating) guidelines. The number of patients seen by the nursing team varies greatly depending on the availability of the nurses at the clinic and changes in the needs of their patients. Typically, there is at least one nurse at clinics running from Monday through to Thursday, with between 35 and 45 patients seen in total each month. The duration of nurse appointments (approximately 45 minutes) tends to be much longer than that of consultant appointments, as they involve more in-depth discussion about blood sugar readings, diet and diabetes management.

One receptionist manages the booking and checking in of patients for the 6-monthly scheduled appointments with the consultant. This includes scheduled face-to-face and Skype appointments. The receptionist checks the patient into their appointment using the Cerner (Cerner Corporation, North Kansas City, MO, USA) electronic patient record (EPR) on their arrival (indicating their arrival to the nurse assistant) and checks them out after the appointment. In most cases, the receptionist will book the patient in for their next follow-up appointment and print off the appointment letter at the reception desk. In addition to managing the appointment bookings and recording attendance, the receptionist is also responsible for ordering and preparing the patient medical folders. This involves reviewing the clinic schedule (approximately 2 weeks prior to clinic) and ordering (and often chasing up) hospital notes from central storage at the main hospital building. When the required hospital notes arrive, the receptionist is responsible for ensuring that they are organised and labelled for the appropriate clinic and clinician. Immediately prior to the clinic, the receptionist will also print a list of all patients to be seen (with basic personal information) for the nurse assistant and consultants. At the end of each clinic, the receptionist will record the DNA appointments in the EPR and box up the hospital notes for collection and central storage. Additional administrative support includes a service manager to manage the running of the clinic, including staff time and resources, working space and budget. The consultant also has a secretary, who is primarily responsible for dealing with the patient databases and the transcription, generation and postage of GP letters.

Antenatal Diabetes services

The Antenatal Diabetes team consists of three diabetes consultants, three obstetricians, two nurses (diabetes and endocrinology nurse specialists), one midwife, one service co-ordinator and an administrator. The service provides care to approximately 350 patients per year, nearly all with gestational diabetes. The weekly Antenatal Diabetes clinic runs on a Friday morning, with up to 50 patients per clinic. A Wednesday morning ‘spill over’ clinic is also conducted, which tends to be used for new patients.

Much of the medical information used to support the consultation is held within the patients’ maternity folder. Key medical information is replicated in the hospital records. However, day-to-day insulin doses and blood sugar readings, as well as appointment notes and recent medical tests (e.g. scans, blood tests), are stored in the patient-held maternity folder, and it is therefore a key artefact in the consultation. Although patients are assigned appointment slots, there is still much flexibility as to when patients are seen, and the diabetes consultants and midwife clinicians will often decide among themselves as to who will, and when to see, particular patients. In addition to the outpatient clinic consultations, the midwife conducts a weekly virtual (telephone) clinic to keep in touch with patients they wish to monitor more closely (e.g. patients struggling to manage their blood sugar levels). These patients are asked to call the midwife during a fixed time period, although it generally involves the midwife needing to initiate contact.

Like the Adult/Young Adult Diabetes clinic described above, the Antenatal Diabetes clinic requires pre-appointment tests and checks. This is supported by a team of 3 or 4 nurse assistants who call the patients’ names at the waiting room and take them into an examination room for pre-appointment check (weight, blood pressure, ketones), documenting these in the patient’s maternity folder. The outpatient clinic has one main reception desk (usually with two receptionists) to manage the flow of patients into the clinic. This involves booking patients in and out of the appointments on the Cerner EPR, but also tracking their order of arrival to ensure some consistency and fairness in waiting time. This allows greater flexibility for the clinicians to decide when to see patients and maintain a constant flow of appointments. This is an important task, given the large number of patients and multiple staff and appointment types involved. The receptionists also organise the hospital records prior to the clinic, so that these can be taken (along with the maternity folder) during the consultation.

Booking of subsequent appointments following the consultation is done by an antenatal diabetes administrator, who remains present at the outpatient clinic to obtain the clinic outcome forms and book the required appointment. The service co-ordinator remains in a separate office and leads on the overall management of the patient appointments, and is responsible for contacting patients to confirm or rearrange appointments when needed and for making sure that the hospital records are prepared and stored before/after the clinic.

Hepatobiliary and Pancreatic Cancer Surgery service

The Royal London Hepatobiliary and Pancreatic Cancer Surgery service is a tertiary service to which patients often have to travel long distances. It provides contrasting organisational, demographic and clinical challenges to the diabetes example, while also being nested, broadly

speaking, in the same meso-level context. Patients with pancreatic and liver cancer have a very diverse demographic and may live up to 200 miles from the clinic. They have in common a life-threatening diagnosis, major surgery and a prolonged postoperative phase, in which they have to cope with multiple physical, emotional and practical challenges. Almost all patients have a direct and ongoing relationship with both the consultant surgeon (SB) and the specialist nurse (SR), sometimes going back several years. At the start of our study, the service had just begun to introduce virtual consultations in order to spare selected patients unnecessary travel.

The Hepatobiliary and Pancreatic Cancer Surgery clinic runs on Monday mornings, led by a consultant surgeon and supported by two specialist registrars and a hepatopancreatobiliary (HPB) clinical nurse specialist. Up to 25 patients can be seen during one clinic, with around 10–15% of these being related to postoperative cancer follow-up. The HPB nurse specialist leads on the planning and co-ordination of the clinic, preparing the lists and notes of patients to be seen, and allocating patients to the particular consultants, depending on their availability and the complexity of the patient's condition or stage in their treatment. The HPB nurse specialist also takes a leading role in contacting, and being the contact point for, patients to address or follow-up on queries or issues related to their treatment. The HPB nurse also plays a key role in compiling relevant test results (e.g. from blood tests) needed for upcoming consultations.

The Hepatobiliary and Pancreatic Cancer Surgery clinic is run in a shared hospital space alongside other clinical services. The clinical team is supported by a team of nurse assistants based within this space, who support all of the clinic services running during the Monday morning clinic. The nurse assistants conduct required pre-appointment checks and inform the HPB nurse specialist when the patient is ready to be seen. The reception desk (with a team of up to four receptionists) check patients into their appointments on the Cerner EPR on arrival, and then books them out when leaving. As is the case in the Adult/Young Adult Diabetes clinic, the receptionist will book the patient into their next appointment (indicated on the clinic outcome form). However, the appointment letters are printed and posted to the patient via a centralised printing room. The GP letters are typed by the consultant or specialist registrars immediately after the appointment and sent on to the team secretary for printing and posting.

The team office space is spread across different parts of the main hospital building. However, much of the team members' time outside the outpatient appointment is spent in theatre and on hospital walk-rounds.

Sampling

Sampling: macro level

To sample for the national-level interviews, we began with individuals charged with delivering IT strategy in NHS England. Alongside a review of policy documents (from 2000 onwards), we used a combination of purposive sampling (identifying a range of potential interviewees from policy documents and colleagues (e.g. steering group members) and snowball sampling (asking each interviewee to nominate a colleague) to ensure maximum variation in our sampling frame and enable us to build up a rich picture of the national context. We initially identified 45 potential stakeholders from across the government (e.g. NHS England, Care Quality

Commission, NHS Improvement), professional organisations (e.g. the Royal College of Physicians, Medical Protection Society), patient groups (e.g. National Voices), industry (e.g. Microsoft) and charitable and third-sector organisations (e.g. the Health Foundation). We then invited a maximum variety sample of 39 of these stakeholders to talk informally with the study team. Of these, we spoke with 36, and three were uncontactable. We then undertook semistructured interviews with a purposive sample of 12 of these stakeholders, ensuring variation in the number of different institutions, groups and perspectives represented.

Sampling: meso level

The goal of sampling in the meso-level study was to map the people, interactions and organisational routines that support the virtual consultation, with a view to building a rich ‘ecological’ picture of the sociotechnical microsystem¹⁵⁹ (and its wider embedding in the organisation) needed to make this model work as ‘business as usual’. We began from each of the three clinics where virtual consultations were held, mapped the individuals and technologies involved there and then moved outwards to include finance and clinical informatics departments (among others) in order to explore the organisational change required to embed online care within the NHS.

Sampling: micro level

The goal of sampling in the micro-level study was to capture the breadth of experience (of patients and staff) of the remote consultation. We therefore sought a purposive sample (i.e. based on the characteristics of the clinic population) of up to 30 consultations across the Adult/Young Adult and Antenatal Diabetes clinics, and up to 15 consultations in the Hepatobiliary and Pancreatic Cancer Surgery service. The lower number in Cancer Surgery was because we anticipated far greater practical and ethical challenges to gaining informed consent and avoiding harm, and we did not want to put excessive pressure on either the service as a whole or individual patients, clinicians or researchers. Within each subsample, we sought maximum variety in clinical, social, ethnic and personal circumstances, as well as in health and IT literacy.

In Diabetes, we extended a successful pilot study¹⁰ to a wider group and sought a maximum variety sample, including:

- young people (aged 16–25 years) – many of whom are busy (e.g. studying or at work), not well engaged with secondary care, have high DNA rates and risk adverse outcome if lost to follow-up
- older people – who may find it difficult to travel (e.g. because of comorbidity)
- limited English speakers – some of whom find the health system difficult to navigate and require an interpreter

- women who had recently had diabetes in pregnancy – many of whom may be busy with young children and/or have other duties, and struggle to engage with the service.

Our sample for Cancer Surgery was a tertiary care surgical centre in which each patient typically requires multiple contacts, some of which can require a (perhaps lengthy and inconvenient) trip. We sought to include the following kinds of interaction that might be suited to remote consultations:

- preliminary orientation – following a first face-to-face consultation, a nurse might contact the patient remotely to explain what will happen during their hospital admission and deal with questions and concerns
- postoperative follow-up – where clinically appropriate, a convalescing patient with cancer may potentially be seen remotely rather than attend in person
- post-treatment surveillance – patients who have had tests at their local hospital and are transmitted to the tertiary centre may be contacted remotely to discuss the results.

Clinician participants included all consenting members of clinic teams (senior and junior doctors, specialist nurses) across both Diabetes clinics and the Cancer Surgery service.

As virtual consulting is a new medium, with potentially harmful effects for some patients, it was crucial (from a clinical and an ethical perspective) that clinicians were able to exercise judgement about which patients to invite to join the study. Patient participants were therefore selected for invitation on the judgement of the clinician, from the denominator population of all those attending participating outpatient clinics. Exclusion criteria were no 3G access at home, lack of familiarity (by patient or family carer) with the relevant technology, clinical inappropriateness (e.g. the need for direct physical examination), inability to give informed consent and comorbidity preventing participation (e.g. severe visual impairment).

The clinic populations included a high proportion of limited English speakers, whose inclusion was different in different services, reflecting current clinic ways of working. In the Adult/Young Adult Diabetes clinic, bilingual health advocates were available and trained in the use of remote consulting, so limited English was not an exclusion criterion there. In the Antenatal Diabetes clinic and the Cancer Surgery clinic, those who were comfortable with a family member interpreter were included, but a remote interpreting service was not available.

Someone not involved in the VOCAL study (e.g. a receptionist) made the initial approach to patients, providing them with a letter of invitation and consent forms as they arrived for their outpatient consultation. Those wishing to hear more were then contacted by a researcher, following a (minimum) 1-week reflection phase to give people time to think about the study before being contacted.

Training in the use of remote technology or technical support for its use at home were not offered.

Data collection

A summary of data collection and analysis across the different levels (macro, meso and micro) in the VOCAL study is presented in [Table 1](#).

Data source	Type and nature of data	First-order
Macro-level study of the wider context for introducing remote consulting	<ul style="list-style-type: none"> Accounts of national-level stakeholders (12 formal semistructured/36 informal interviews) 	<ul style="list-style-type: none"> Historic drivers remote System-

TABLE 1

Overview of multilevel data collection and analysis in the VOCAL study

Data collection: macro level

Capturing the perspective of national decision-makers was key to our multilevel analysis of the contextual factors accounting for the success and potential transferability of this new service model. To achieve both these ends, we identified relevant policy documents from 2000 onwards, spoke informally with 36 national-level stakeholders and conducted 12 ‘executive-level’ semistructured interviews (see [Table 1](#)).

A topic guide was used in interviews (see [Appendix 3](#)) that focused on the key drivers and facilitators for remote outpatient consultations, operationalisation of (and potential blocks to) relevant policy, and key successes and disappointments.

Data collection: meso level

Our focus at meso level was on mapping the sociotechnical microsystem that supports remote consultations. To do this, we drew on a methodology for ‘mapping the sociotechnical healthcare ecosystem’¹⁵⁹ that combines a sociotechnical approach (mapping the people and technologies involved) and a human ecology approach (placing particular emphasis on relationships and interdependencies).

Data collection focused on the work routines and processes required to accommodate and support the use of Skype for remote consulting. We captured this through:

- ethnographic observation of the work involved in remote consulting, involving physically visiting the different departments and observing the clinical and administrative work that takes place
- naturalistic interviews with clinicians, administrators and executives, involving asking people ‘on the job’ what they are doing and why they are doing it (as people often find it easier to talk about the detail of their job while they are actually doing it¹⁶⁰); and

- collecting key documentation (e.g. existing operating procedures, informal guides and notes made by staff to help them do their job, meeting minutes) and e-mail correspondence.

We originally planned to conduct consolidation workshops with service staff. However, as we engaged with clinics, we found that we were welcomed into each of the clinics and within mainstream governance structures and working groups (e.g. formal and informal meetings with representatives from ICT and the outpatient project strategy group). We therefore elected to focus our efforts and observations there.

Data collection: micro level

Our micro-level data set consisted of video-recordings of consultations (see [Table 1](#)), incorporating two video streams: what the clinician sees and does in the clinic, and what the patient sees and does at the remote site (typically their bedroom or living room at home, although sometimes via a handheld device elsewhere). We recorded consultations using a small digital camcorder with wide-angle lens and remote control (Sony Handycam DCR-SR72; Sony Corporation, Tokyo, Japan), mounted on a mini tripod and positioned unobtrusively (e.g. on a shelf). The camera's field of view captured as much as possible of each individual and their orientation towards the screen (either on a computer or handheld device), as well as some contextual detail (e.g. the layout of the room). In 10 of the cases, the consultation was recorded at the clinic end but not at the patient end, either because the patient did not wish to be filmed in their home (but was happy to be filmed from the clinic) or because it was not practically possible to arrange for the recording to take place (e.g. for consultations that were agreed between the patient and consultant only a short time beforehand or if the patient could not predict where they would conduct the consultation remotely). We also captured clinician and patient interaction with the video-conferencing software and other tools used in the consultation. We used a commercially available screen-capture software tool (ACA Systems; ACA Systems, Washington, DC, USA) to record screen images showing on each party's computer screen as a video file. This was run directly from a USB memory stick. The researcher (JW) was minimally involved in the virtual consultations, being present to start and stop the recordings, but then leaving the room during the consultation. In some cases, the patient or clinician sought advice or support from the researcher in setting up the virtual consultation (e.g. switching on the video). After the consultation, the researcher returned to the room and confirmed that both patient and clinician were still willing for the video material to be used as part of the VOCAL study. The software was run using an encrypted USB stick, and so could only operate on a PC or laptop. In many cases, the patient would use a mobile, tablet or Mac computer (Apple Inc., Cupertino, CA, USA), which could not run the encrypted device. In such cases, the researcher positioned a second digital camera to capture the screen.

Each end of the consultation resulted in two digital files: one screen capture and one video. We synchronised these into one file using video-editing software (Sony Movie Studio; Sony Corporation, Tokyo, Japan) – meaning that the video of the computer screen could be played exactly in parallel with a video of the patient looking at the screen – and then aligned the patient and clinician 'ends'.

Care was taken to obtain and maintain informed consent. Information sheets and consent forms (see *Appendices 4–9*) incorporated guidance issued by the General Medical Council on the video-recording of consultations for research purposes, including an opportunity to withdraw consent after the consultation.¹⁶¹ When recording remote consultations, the researcher arrived at the patient's chosen venue (usually their home) at least 30 minutes before the booked time slot, so as to explain the procedure again, confirm consent and get it in writing, and informally discuss the patient's hopes, fears and expectations for the consultation. We sought similar consent from the health professional at the clinic end of the consultation.

The face-to-face consultations were audio-recorded using a digital recorder. Patients were identified by the clinician before the appointment and invited to participate in the study. Participants were selected on the basis that the type of consultation was similar to those conducted via Skype (e.g. routine follow-up cancer appointments) and that the consultant would consider such cases suitable for a consultation via Skype. During the face-to-face consultations, the researcher (JW) sat to one side in the consultation room to audio-record the conversation and take field notes of the actions and interactions between the clinician and patient.

We transcribed all face-to-face and virtual consultations using ELAN (version 5; Max Plank Institute for Psycholinguistics, Nijmegen, the Netherlands), a specialised program for transcribing and analysing complex video and audio resources that allows researchers to capture the complexity of the data set, simultaneously follow video, audio and multiple 'tiers' of transcription (e.g. doctor, patient, carer) and record analytic memos and notes. This was particularly important for the multimodal data in our data set, the transcription of which requires judgements to be made about the level of detail to include¹⁶² and how to interpret and represent, for instance, non-verbal behaviour and body language.¹⁶³

In addition to the above, we made contemporaneous field notes when at each patient's home (e.g. relating to the patient's material circumstances and cultural factors affecting their self-management) and the clinic (e.g. relating to the physical circumstances in which the clinician makes the remote call, including the use of additional artefacts and technologies, such as paper or electronic records).

We collected a minimum data set (age, gender, ethnicity) on all patients seen in each clinic, as well as those participating in virtual consultations within the study. The way in which this was calculated in each clinic differed depending on the availability of the data. In Hepatobiliary and Pancreatic Cancer Surgery, the demographic data were drawn from a review of 12 months of clinic lists (July 2016 to June 2017). In Antenatal Diabetes, data were drawn from an audit conducted in 2015–16 (the most accurate available data in this setting). In Adult/Young Adult Diabetes, data were drawn from a 12-month review of records for nurse clinics (with young adults, from June 2015 to May 2016) and a 12-month review for consultant clinics (with adults and young adults, from August 2016 to July 2017). We used Pearson's chi-squared test to compare categorical groups for gender, age and ethnicity.

Data analysis

Data analysis: macro level

Interviews with national stakeholders were initially analysed thematically to provide the wider context for understanding what is going on locally. In previous studies of small-scale encounters and organisational routines in health care, we have found that staff refer (more or less accurately) to such influences as ‘national policy’, ‘the law’ or ‘my Royal College’. We therefore compared data from (macro-level) interviews and documents in each of these themes with statements, actions and interpretations made by (meso-level) organisational actors, searching for tensions and ambiguities (e.g. the general push for remote consultations in the NHS by national-level stakeholders, alongside locally negotiated payment systems at the organisational level). Finally, guided by interpretive policy analysis,^{164,165} we extended our analysis to identify the key ‘storylines’¹⁶⁶ shaping policy and debate around remote consultations, and to surface the ambiguities.

Data analysis: meso level

Our approach to mapping the sociotechnical health-care ecosystem¹⁵⁹ provided detailed data about the logistical and technical barriers involved in introducing and running remote consultation services (in Diabetes and Cancer Surgery clinics, as well as the wider hospital, such as ICT and IG departments), and the tasks performed to overcome them. This included data about issues related to technology (e.g. installing Skype onto NHS computers, reconfiguring electronic clinic booking systems to identify ‘webcam’ appointments), clinic management (e.g. obtaining private office space for Skype appointments), administrative processes (e.g. setting up and recording ‘Skype appointments’ on clinic systems), patient enrolment (e.g. explaining the Skype service) and clinical reasoning with regard to a patient’s suitability for Skype (e.g. the need for physical examination, engagement with self-management).

We used both diagrams and narrative as synthesising devices to draw together a visual representation and linked verbal account of these human and technical interactions, and the interdependencies on which the successful execution of a virtual consultation depends (i.e. the service as a whole, as well as individual virtual consultations).

We also drew on the notion of ‘organisational routines’^{142,167} defined as ‘recognizable, repetitive patterns of interdependent action carried out by multiple actors’.¹⁶⁸ Routines are how organisational life is patterned, and, hence, studying these provides important insights into how innovations like remote consultations may (or may not) be assimilated in health care, and how that assimilation changes over time. In studying routines for remote consultations, we identified and compared artefacts, such as protocols (‘proxy routine’¹⁶⁷); understandings held by staff of how this routine should be enacted (‘ostensive routine’¹⁶⁷), and the range of ways in which the routine is actually enacted in an observed instance (‘performative routine’¹⁶⁷). We were also interested in ‘routine dynamics’¹⁶⁸ (i.e. the dynamics within and across routines), and so identified and examined the internal dynamics of (particularly) performative routines to understand how they contribute to both stability and change in virtual consultations and wider services.

We identified the work required (at clinic, departmental and executive levels) to make a repetitive pattern of action appear to be routine; examined the dynamics within and across different routines as they are put into practice, in an attempt to develop and deliver remote

consultation services; and analysed the convergence and divergence between proxy, ostensive and performative routines to reveal the tension between current business as usual and the new ways of working implied by a remote consultation model.

Data analysis: micro level

Our initial analysis of the micro-level data involved repeated viewing of selected virtual consultations and discussion in interdisciplinary meetings (including representation from sociology, linguistics, human–computer interaction and medicine), alongside review of the interview data with patients and clinicians. This led us to identify a number of questions, including, for instance, the ways in which the context of the consultation (often involving patients in their home setting and the clinician at the clinic) shaped communication; if/how the usual format of the medical consultation (opening, history-taking, examination, diagnosis and review) might shift when conducted over Skype, how the talk about technology in consultations might reorient the interaction between patients and clinicians or how sensitive topics (such as breaking bad news) are avoided or addressed.

On the basis of these early emerging themes, we explored the literature to find a methodology to add depth and detail to our findings and identified the RIAS, a method for coding medical dialogue that has been widely used in Europe and the USA.¹⁶⁹

The RIAS is an established system for assessing medical interactions and, hence, offered a suitable analytical approach for detailed examination of the interactions between patients and clinicians in both virtual and face-to-face consultations. Broadly derived from social exchange theories related to interpersonal influence, problem-solving and reciprocity,^{170–172} RIAS offers a coding system that allows researchers to systematically quantify the occurrence of different types of talk that occur during medical encounters that reflect accepted patient and provider roles and obligations in a ‘meeting between experts’.¹⁶⁹ It thus offers a complementary perspective to other approaches to analysing interaction and communication (such as conversation analysis). It offers a predefined framework of what its authors consider to be ‘mutually exclusive and exhaustive categories’¹⁶⁹ for codifying the contributions of patients and clinicians to remote consultations.

The RIAS coding draws a distinction between task-focused and socioemotional talk. For physicians, task-focused behaviours are defined as technically based skills used in problem-solving, which comprise the base of the ‘expertness’ acquired through professional medical education and for which a physician is consulted. From a communication perspective, physicians’ task-related talk includes talk related to the performance of medical functions, such as data gathering, tests and procedures, the physical examination and patient education and counselling. The socioemotional dimension of physician talk includes those exchanges with explicit affective content related to the building of social and emotional rapport, for instance, the use of social amenities, empathy, concern or reassurance. Patients’ communication is viewed similarly, with the task-focused talk reflected largely in patient question-asking and information-giving, and the socioemotional domain including the expression of concern, optimism, empathy, laughter and joking and social chit-chat.

Table 2 shows the high-level clusters and detailed categories used in the RIAS, with examples drawn from our data. The first three clusters (socioemotional, task focused and process) are drawn from Roter’s original work;^{170,173,174} the fourth is a new category relating to technology talk, initially introduced by others¹⁷⁵ and adapted by us.

Cluster/category	Codes
	Socioemotional talk and
Social behaviour	Personal remarks, social conversation
	Greeting, converses weather
	Laughs, jokes
	Friendly
	Compliments
	Express the clinician's

TABLE 2

The RIAS clusters and categories, illustrated with examples from our data

The RIAS has not been used extensively in the analysis of virtual consultations previously, although we identified one paper (a conference proceeding) that explored the theoretical potential of the RIAS in technology-mediated consultations,¹⁷⁶ three small empirical studies in different clinical conditions,^{175,177,178} a narrative review of 10 studies of telehealth,¹⁷⁹ including the three aforementioned studies that used the RIAS and seven more that used a less robust coding tool, and a validation study of the new RIAS codes for technology-related talk.¹⁸⁰ Given the technology-mediated nature of the virtual consultations that we were analysing, we added the fourth cluster (see *Table 2*) on technology-related talk to extend the technical cluster introduced by researchers who recently adapted the RIAS for the study of telehealth¹⁷⁵ and adapt this to include categories of socioemotional, task-focused and process talk.

The RIAS has a record of good reliability and demonstrated predictive validity, as well as sensitivity to varying medical contexts.¹⁶⁹ Following a 3-day training course delivered by a senior researcher and tutor from RIASworks (January 2017), VOCAL study researchers were able to immediately and systematically code virtual consultations, applying meaningful codes to the small segments of speech (what the RIAS calls ‘verbal utterances’) of patients and providers. The process of coding took approximately 4 minutes for each minute of video or audio data.

The RIAS analysis was undertaken on a subset of the data in which remote consultations were matched with the closest equivalent face-to-face one. A total of 34 recordings were coded to explore how the use of Skype for virtual consultations affects the interaction and dialogue of the medical encounter. This subsample included 12 Antenatal Diabetes consultations (six conducted remotely via Skype and six conducted face to face), 12 Adult/Young Adult Diabetes consultations (six remote and six face-to-face consultations) and 10 Cancer Surgery appointments (five remote and five face-to-face consultations). The consultations were all follow-up appointments after the patient had met the clinician at least once. In the Antenatal Diabetes context, the appointment took place approximately 1 week beforehand to establish a schedule for insulin dosing. In Adult/Young Adult Diabetes, the consultation formed part of a routine 6-monthly review to discuss the patient’s condition, recent test results and treatment plan. For Cancer Surgery, the consultation formed part of the follow-up assessment of the patient’s postoperative recovery and review of medical tests [blood tests, computed tomography (CT) scans] and symptoms (the follow-up interval varied from 3 to 6 months). Virtual and face-to-face

consultations in the data set for each clinic all involved the same clinician (i.e. a consultant diabetologist specialising in the care of pregnant women in the antenatal context, a different consultant diabetologist in the adult diabetes context and a surgeon and a nurse specialist combined in the cancer surgery context). The face-to-face comparisons were selected based on the similarity of the consultation (stage of treatment, purpose of appointment) and the clinician’s judgement that they would also have been suitable for the virtual consultation option.

All consultations were coded using bespoke RIAS software, in accordance with the clusters and categories in [Table 2](#) (and, in some cases, further subcategories). To assess and address any inconsistencies, three coders conducted a preliminary analysis on two video files to form agreement on the RIAS category definitions. Discrepancies in coding were discussed and resolved, with the definition of each code recorded to inform further analysis. This phase informed the adaption of the RIAS categories to distinguish between ‘technology talk’ and existing coding categories from the RIAS manual. To assure coding reliability, two coders then independently coded eight recordings (five remote consultations and three face-to-face consultations). We used Pearson’s *r* correlation to assess inter-rater reliability across each code. This resulted in acceptable reliability ranging from 0.72 to 0.98 across all categories of patient and clinician talk.

Descriptive statistics were used to present proportions of talk across the sample, and for the three different clinical contexts. It had initially been planned to undertake parametric analysis, but the assumptions for normal distribution of the data were not accepted (the Shapiro–Wilk normality test showed significant results at a *p*-value of < 0.05). Therefore, the Mann–Whitney *U*-tests (non-parametric) were used to compare interactions for virtual and face-to-face consultations.

Data summary and synthesis of micro-, meso- and macro-level data

[Table 3](#) summarises the final macro-, meso- and micro-level data sets for the VOCAL study.

Level	
Macro (national context)	Meso (organisational context)
36 informal, scene-setting interviews: <ul style="list-style-type: none"> • 7 from industry • 7 in IG/regulatory bodies 	Field notes from 47 100 hours of ethno observation, 15 semi-structured interviews and 15 naturalistic interview workshops with:

TABLE 3

Summary of the data sets for the VOCAL study

The synthesis of the data sets summarised in [Table 3](#) was guided by the following questions, informed by the SST framework (see [Theoretical approach](#)):

- How does the dynamic relationship between the macro (external social structures), meso (organisational routines and logics) and micro (individual understandings, dispositions and front-line actions) contexts explain how a real-time video consultation unfolds in the

contrasting clinical settings of routine diabetes care and preoperative and postoperative cancer care?

- How do the outcomes of remote video consultations feed back in the short term to change (positively or negatively) the position-practice relations of the patient and the clinician, and in the longer term, the ability of the organisation and the health-care system to accommodate and sustain this service model?

In [Chapters 3–5](#), we present the macro-, meso- and micro-level findings addressing these questions.

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