Virtual Online Consultations: Advantages and Limitations: A qualitative study of micro, meso and macro level interactions

Summary of research

We will conduct a series of in-depth qualitative studies of interpersonal interaction (micro) embedded in an organisational case study (meso) with key informant interviews at national policy level (macro). The study will be based in two contrasting departments on different sites of a large NHS acute trust.

Micro component

This is the study's main focus. We will study interactional dynamics by generating a multi-modal dataset (audio, video and computer screen capture). We will transcribe talk, including selected segments in detail (capturing intonation, pauses and so on) and annotate the transcripts with notes on gestures and other actions. Each 'case' will comprise a transcript plus video, analysed sociologically in a way that highlights how one party responds to, and shapes the talk and action of, the other – and how technology affects such human interactions. We will do this in two groups:

GROUP 1: PEOPLE WITH DIABETES (n = 20-30).

We will extend a successful small pilot to a wider group and assess a maximum variety sample, including:

A. Young people (16-25 years). A priority because many are busy (eg at college or work), not well engaged with hospital care, have high DNA rate and risk adverse outcome if lost to follow up;
B. Older 'housebound' people. A priority because they may find it difficult to travel because of comorbidity and/or lack of carer;
C. Limited English speakers. A priority because some people in this group find the health system difficult to navigate and many require an interpreter, who could join the consultation via Skype;
D. Women who have had diabetes in pregnancy. A priority because many are too busy with the new baby and/or other relatives to prioritise their own health, but they may require frequent review. In particular, virtual follow-up consultations could help address poor uptake of postnatal oral glucose tolerance tests (OGTT). The OGTT requires two blood tests two hours apart but discussion of test results and implications could be done virtually.

GROUP 2: PEOPLE HAVING CANCER SURGERY (n = 10-15).

Cancer surgery in a tertiary centre requires multiple clinician-patient contacts, not all of which need a (perhaps lengthy, inconvenient and confusing) trip to hospital. The following might suit virtual interaction:

A. Preliminary orientation. Following a first face-to-face consultation, a nurse might Skype the patient to explain what will happen during their hospital admission, and deal with questions and concerns;
B. Post-operative follow-up. Where clinically appropriate, a convalescing cancer patient may Skype rather than attend in person.
C. Post-treatment surveillance: Patients who have had tests at their local hospital and transmitted to the tertiary centre can be contacted virtually to discuss the results.

We will invite all eligible patients to try virtual consultations as an alternative to face-to-face. We will compile descriptive data (age, gender, ethnicity, IT experience/access) on all invited to estimate acceptance bias. Because data collection will require a researcher to attend the patient's home, they will show them how to use Skype if necessary and capture their expectations prior to, and reflections following, the consultation.

Meso component

The clinical team will map the administrative and clinical processes that will need to change to embed online consultations e.g. changes to clinical care pathways, potential changes to staff roles, use of " traditional" outpatient space. The trust Chief Information Officer will lead on the information management changes needed to make virtual consultations business as usual and explore potential scope of online consultations within other specialities. Our GP commissioning lead will work on local tariffs for online care, and creation and commissioning of patient self-management systems

Macro component

We will conduct 10 interviews - including national policymakers (e.g. DH, Monitor) and other key stakeholders (e.g. Royal Colleges, information governance, patient experience) to explore barriers to supporting virtual consultations. This will build links for national dissemination, though we note that we are not allowed to make recommendations for policy.

Background and rationale

England's Secretary of State for Health has proposed (somewhat prematurely, perhaps) that outpatient care in the National Health Service should be radically redesigned so that remote consultations, including telephone, email and via real-time video such as Skype, become the norm for many conditions (see http://m.health.org.uk/news-and-events/news/health-secretary-jeremy-hunt-commends-innovative-shine-project/). This strong policy push links to a number of other government policies, including the drive to provide care closer to home [1], the continuing priority of information systems that are modern and fit for purpose [2], the perceived need to improve efficiency of services through innovation and new technology [3], the 'three million lives campaign' (a concordat with the telehealth/telecare industry to promote innovation while also improving health outcomes [4]), and the introduction of GP commissioning [5].

We were asked by NIHR to provide a "full literature review of alternatives to face to face contact" before looking specifically at Skype and other real-time video formats for outpatient consultations. The vastness of the literature and diversity of studies (and space constraints) preclude a comprehensive review. The outline below focuses mainly on systematic reviews (where available) and seminal theoretical or methodological studies. The range of models for patients to link with health services via technology includes:

- **Telephone**, with various models for assessment and triage of acute problems, with or without clinical advice [6-19]; GP consultations [20-22]; call-back services from a doctor to manage heavy demand in general practice, increasingly promoted (see http://www.productiveprimarycare.co.uk/doctor-first.aspx) but which to our knowledge have not been formally evaluated; 'cold calling' to offer health education [23]; and follow-up of chronic illness [24]. In sum, this literature consists mainly of relatively small and heterogeneous primary studies, most of which had significant practical challenges or methodological flaws. Systematic reviewers have tended to conclude that while telephone contact for acute illness may allow minor complaints to be dealt with without a face to face visit (and sometimes with apparent cost savings), it may miss rare but serious conditions and/or lead to higher rates of face to face visits in subsequent days – perhaps because even when patients have been adequately assessed, they may be inadequately reassured. This is particularly the case when call handlers with limited training are working largely to algorithm, as in NHS111 [11]. Telephone consulting, it seems, requires considerable skill and judgement, perhaps because of lack of visual cues. Qualitative studies using conversation analysis have found that compared with traditional face to face consulting, telephone consultations have a more linear format and tend to focus on a narrow range of pre-planned themes, with less opportunity for the patient to raise issues spontaneously [20, 21]. These rich qualitative findings raise the interesting question of whether the same would be true of video consultations – or whether the addition of high-quality visual medium would emulate the ethos of the face-to-face environment.
- **Text messaging**, for example for supporting young people with chronic illness [25]; conveying results of tests [26]; or sending health promotion messages [27, 28]. These studies (which were undertaken on population samples that may not be representative) showed that the text-messaging medium was popular with patients, who used it proactively to send questions (an unanticipated finding) as well as passively (as anticipated) to receive messages sent by health professionals. Whilst text messaging is a very different medium to the one we plan to test, these findings illustrate an important principle that the introduction of new technology in a social system is what Barley called "an occasion for structuring" – that is, it creates possibilities for human agents to related to one another differently, and does not in any simple sense *determine* those relationships [29].
- **Email** consultations [30-32]. Systematic reviews of a large number of primary studies (mostly of poor quality) have confirmed proof of concept (that is, it is *technically possible* to consult via email) and that some sectors of the population *desire* such contact, but have also raised the possibility of

increased inequality of access (the service is likely to be used most by young middle class patients, potentially increasing inequality of access for those who are older, poorer and with lower health literacy). Qualitative studies have highlighted professional uncertainty about safety, workload and remuneration, and about the 'rules of engagement' for online interaction [32].

- **Online portals** for prescription ordering [33], appointment booking [34, 35], and patient access to their online record [36]. Whilst these and other research studies have demonstrated proof of concept, such portals are not widely used by patients outside the research setting.
- **Telemedicine**, in which one part of a health service, usually in primary care, links remotely to another, usually in secondary care (eg telepsychiatry or teleradiology). There are many proof of concept studies [37-41] and examples of up-and-running services, mostly in remote regions (for example Scotland http://www.sctt.scot.nhs.uk and Australia http://www.telemedicineaustralia.com.au). But the adoption, spread and sustainability of telemedicine services is often disappointing for complex reasons, including cost, logistics and subtle adverse impacts on professional roles, interactions and work routines [37, 42].
- **Telehealth**, based in the patient's home, in which data on biometric variables (such as blood pressure or oxygen levels) are sent to a data processing centre and (sometime later) evaluated by a health professional who contacts the patent if needed by email or telephone [43-47]; and **telecare**, in which sensors carried by a person or installed in the home allow remote monitoring of position and/or detect smoke or flooding [44, 47-50]. Also known as 'assisted living technologies', telehealth and telecare are the subject of much debate. On the one hand, proof of concept (that the technology 'works') has been shown for many such technologies and some randomised trials have demonstrated improved outcomes such as reduced hospital admission and mortality rate [45]. But many trials have been criticised as small, unrepresentative and methodologically flawed, and the largest and best-designed trial achieved improvements in outcomes only at a cost that is probably unaffordable in NHS practice [45].
- Combinations of the above – for example a systematic review of the cost-effectiveness of 'telehealth' that included both home-based and telemedicine services, which showed that both the efficacy and costs of such services varied considerably across studies [46].

The above taxonomy follows the usual convention adopted in the medical literature: it is *technology-centred* – we classified options primarily by the nature of the technology and secondarily by the task supported by that technology. Elsewhere, we have criticised such technology-focused approaches, arguing that designs that seek to compare 'technology on' with 'technology off' in an experimental or quasi-experimental design are inevitably crude and deterministic [43, 51-54]. In those articles and commentaries, we argue that whilst experimental studies have their place, they are not the design of choice for teasing out the (often subtle) social and material interactions occurring between patent, staff member and technology(ies). Only in-depth qualitative studies can reveal how individual identity, experience, expectations and material skill might alter these interactions (by providing what Barley called "an occasion for structuring" – possibilities for interacting differently [29]) and make them more – or less – efficient and effective.

Aims and objectives

Aim

To define good practice and inform its implementation in relation to clinician-patient consultations via Skype and similar virtual media.

Research questions

1. What defines 'quality' in a virtual consultation and what are the barriers to achieving this?
2. How is a successful virtual consultation achieved in an organisation whose processes and systems are mostly oriented to more traditional consultations?
3. What is the national-level context for the introduction of virtual consultations in NHS organisations, and what measures might incentivise and make these easier?

Strategic objectives

1. At micro level, to conduct an in-depth qualitative study of the clinician-patient interaction in a maximum variety sample of 30-45 outpatient consultations in two clinical areas. In particular, to highlight examples of good communicative practice; to identify and characterise examples of suboptimal communicative practice; and to propose approaches for minimising the latter.
2. At meso level, to illuminate and explore the socio-technical microsystem that supports the virtual consultation, thereby identifying how organisations can best support the introduction and sustainability of this service model in areas where it proves acceptable and effective.
3. At macro level, to build relationships with key stakeholders nationally and identify from their perspective how to overcome policy and legal barriers to the introduction of virtual consultations.

Operational objectives

We will

1. Establish a cross-sector steering group with extensive user representation;
2. Recruit a maximum variety sample of 20-30 people with diabetes and 10-15 people referred for cancer surgery, representing diversity in clinical, social, ethnic and personal circumstances, and in health and IT literacy;
3. Using a previously piloted methodology, collect a rich multi-modal dataset on a virtual consultation for each participant, comprising video, audio and computer screen capture;
4. Transcribe and analyse these data using conversation analysis conventions and a symbolic interactionist theoretical lens to generate findings on the detailed dynamic of the interaction;
5. Using ethnography, process mapping and naturalistic interviews, map the people, technologies and interactions which make up the socio-technical microsystem that supports the virtual consultation;
6. In a sample of key informants at national policy level, conduct semi-structured interviews to explore perceived barriers and facilitators to introducing virtual consultations as a significant component of an NHS service;
7. Work with local senior health service managers and commissioners to understand the organisational change required to embed virtual consultations. We will bring staff together six monthly, for a consolidating learning workshop, including gathering feedback from all those involved in, or impacted by, web-appointments across all levels of the organisation.
8. Write up findings for academic, policy and lay audiences and disseminate findings.

Research plan / methods

Theoretical / conceptual framework

We will draw on a framework developed previously from Stones' strong structuration theory (SST), which had extended the seminal work of Giddens [55]. More specifically, we will apply Greenhalgh and Stones' adaptation of SST to embrace the adoption, implementation and scaling up of new technologies in health settings [56]. Structuration theory links the macro of the social environment ('social structures') with the micro of human action ('agency') and considers how this structure-agency relationship changes over time as society becomes 'modernised' [57]. Its central tenet is that society (through rules, norms and meaning-systems) profoundly influences – though, importantly, does not *determine* – human behaviour and that human behaviour (through the interpretations and active choices made by individuals) can in turn change society as people challenge and extend what is possible and expected. The structure-agency link is mediated through scripts (patterns of behaviour and interaction in social settings), which gradually change over time [29]. Scripts link to organisational routines and hence to the routinization of innovations [58].

SST is a contemporary adaptation and extension of Giddens' original theory. Whereas Giddens formulated structuration theory in a somewhat abstract way (focusing, for example, on 'structure' and 'agency' as theoretical concepts), Stones has sought to give the theory a more empirical emphasis, focusing on the interpetations and actions of *particular* people in *particular* circumstances, and especially on their assessment of real situations and their efforts to act reasonably in those situations [55]. SST acknowledges that in today's world, human actors are often members of multiple social systems and are linked together in complex networks that are fluid and changing, as shown diagrammatically in Figure 1 [56].

Technology, through its material and symbolic properties, including the rules and pathways built into it, creates possibilities for humans to interact differently and also limits what is possible – for example by requiring a password and IT literacy [29]. Central to SST is the role of human agency in engaging with technologies, finding meaning in them and applying the capacity to use them [59]. This, we believe, is what makes SST more useful as an analytic lens than (say) actor-network theory, which also views humans and technologies as linked in networks but which offers a different (and, we believe, flawed) theorisation of human agency. Unlike actor-network theory, SST offers potential to theorise *human* characteristics such as identity and social role (eg what it means to be a 'professional' and a 'patient'), interpersonal relationships (eg the changing nature of the doctor-patient and nurse-patient relationship as paternalism gives way to more egalitarian relations), health literacy, situational knowledge (eg what each party 'knows' about the other's expectations of an interaction), and the physical capabilities needed to operate technology.

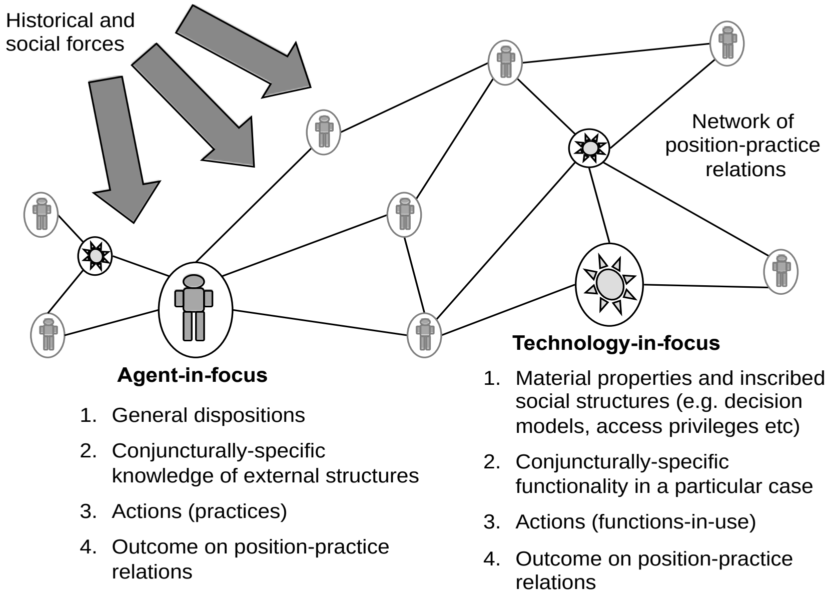

Figure 1: Individuals linked in fluid networks of position-practice relations along with technologies in strong structuration theory (reproduced from [56])

As Figure 1 shows, SST proposes that external social structures (social norms, rules, expectations and so on) are mediated largely through position-practices (defined as a social position and associated identity and practice), together with the network of social relations that recognise and support it ('position-practice relations' – of which the doctor-patient and nurse-patient relationship are good examples).

Figure 2 shows the four components of SST that we will study in our analysis of virtual consultations: external structures, internal structures, actions and outcomes. External structures comprise the fluid set of position-practice relations referred to above and shown in Figure 1. Internal structures may be divided into:

a. General dispositions, which include such things as socio-cultural schemas, discourses and world-views, moral and practical principles, attitudes, ambitions, technical and other embodied skills, and personal values – roughly what Bourdieu called 'habitus' [60]; and

b. Particular ('conjuncturally-specific') knowledge of the strategic terrain and how one is expected to act within it, based on one's hermeneutic understanding of external structures.

To study actions, we look at what Stones calls *conjunctures*. A conjuncture (of which the medical consultation is a good example) is defined as *a pivotal combination of events and actions*. Conjunctures can be studied ethnographically to capture how people play out their position-practice relations, behaving in a way they believe is appropriate and responding in a moment-by-moment way to the other party(ies). Within a particular conjuncture, action occurs when the human agent draws actively and more or less reflexively on his or her internal structures (that is, tries to behave as someone in their position 'should'). To study the agency 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 hand [61]), ethnomethodology (the study of how one person responds, moment-by-moment, to the talk and action of another) [62], and symbolic interactionism (the study of the subjective meaning and interpretation of human behaviour [63]). The theory emphasises that whilst each of us brings generic capabilities, dispositions and strategic knowledge to any particular conjuncture, what we actually do in that situation will depend on a host of specificities including our horizon of action and particular features of context.

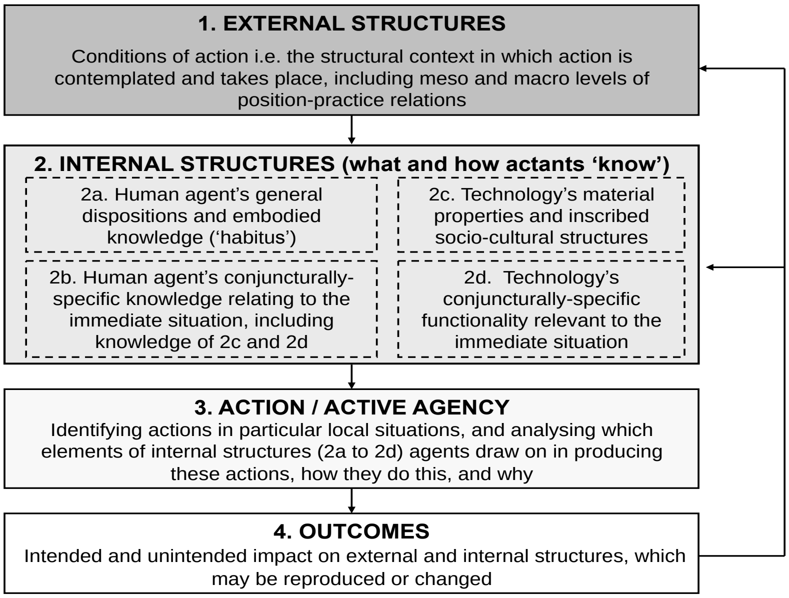

Figure 2: Stones' strong structuration theory, adapted to encompass a technology dimension (reproduced from [56])

The healthcare setting is heavily institutionalised, and behaviour is often ritualised (that is, 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 like efficiency and profit. A person's knowledge of these institutional structures (the 'strategic terrain' as SST depicts it) 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 (Figure 2) is outcomes. The outcome of human action in the consultation may be intended or unintended, and will feed back on both external and internal structures – either preserving them faithfully or changing them as they are enacted. A good example of this in our study is whether a positive virtual consultation will increase the likelihood that the patient will adhere to treatment and attend (in person or virtually) the follow-up consultation.

In sum, the clinical consultation is a social encounter steeped in significance and profoundly influenced by social forces: it is far more than a forum for the exchange of 'facts' or the making of 'decisions' (shared or otherwise). Clinicians, in general, want to do a good job and meet the standards of excellence set by their professional body. They resist technologies which in their opinion interfere with good clinical practice and the exercise of professional judgement [35]. The patient in a clinical encounter will be more or less sick – hence will have goals and concerns (eg pain relief, a particular investigation, a sick note or prescription) and socio-culturally shaped expectations of being cared for and comforted. Their illness may affect their ability to use the technology (eg visual or cognitive impairment in diabetes may make the use of computers impossible without help from a carer). SST provides the potential to turn an analytic lens on how bodily, emotional and cognitive function *interact with* an individual's dispositions, symbolic interpretations and (imperfect) knowledge to affect the unfolding of events and action in the consultation or other conjuncture.

As noted below, the setting of our study is one of the UK's most ethnically diverse districts. The study design and theoretical framework is deliberately chosen to incorporate the analysis and theorisation of tripartite consultations with either a professional or lay interpreter – a topic on which we have already published a number of empirical and theoretical papers [64-66].

We have previously used the technology-enhanced version of SST illustrated in Figures 1 and 2 to theorise how human characteristics, interpretations and actions are central to explaining the success or otherwise of a variety of technology-based initiatives in healthcare, including the attempted introduction of nationally shared electronic patient records in England [53, 67]; nurses' use of computer templates linked to the Quality and Outcomes Framework in general practice [67]; older people's adoption (or not) of assisted living technologies for multi-morbidity [44]; and the slow adoption and later abandonment of the remote outpatient booking software Choose and Book by general practitioners [35, 67]. A more extensive exposition of SST in the context of developing and testing e-health technologies is given in our recent report to NIHR that gives an extended account of some of those empirical studies [67].

The empirical research questions for this study of real-time video ('Skype') consultations in diabetes and cancer are set out on page 4. Expressed in a more theoretical way using the framework of SST, these are:

a. 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) explain how a real-time video consultation unfolds in the contrasting clinical settings of routine diabetes care and subacute cancer care?
b. How do the outcomes of virtual consultations feed back in the short term to change (positively or negatively) position-practice relations of patient and clinician and in the longer term the ability of the organisation and the healthcare system to accommodate and sustain this service model?

Study design

The main empirical component of this study is ethnographic. We plan to collect multi-modal data (video, audio and screen capture at both 'ends' of a remote consultation), link and temporally synchronise these using appropriate software (see below), and analyse the social interaction using SST. In addition, we will use ethnographic methods including naturalistic interviews to prepare a rich organisational case study of the embedding of virtual consultations within different parts of the service, and interviews with national policymakers to give wider context on barriers and facilitators to rolling out such a model nationally.

Setting and context

The setting is Barts Health, the UK's largest acute trust, which was formed in 2012 when three trusts in different boroughs merged. We will study two services on two different sites: Diabetes at Newham Hospital and Pancreatic/Liver Cancer at the Royal London Hospital. Both sites are located in London boroughs (Newham and Tower Hamlets respectively) that are characterised by high socio-economic deprivation and ethnic and linguistic diversity. Burden of disease is high. Like many acute trusts, Barts Health is under pressure to deliver services more cost effectively while responding to rising need and demand.

The Diabetes service (one of whose consultants, SV, is lead co-applicant on this bid) 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 (eg limited English speakers with low health literacy). A key component of this work has been developing strong links with local GPs and deploying specialist nurses and bilingual health advocates in community outreach roles. The GP commissioning lead for Newham, IH, is also a co-applicant on this bid.

Unusually, many 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 16-25 age group (0.57/1000), due to a combination of risk factors (eg poverty, ethnicity, diet, low exercise levels). Engagement with traditional health service models is low in this demographic, with poor health outcomes (eg poorly controlled young adults with diabetes have increased risk of sight-threatening retinopathy and adverse pregnancy outcome) and increased use of unplanned care through A&E.

Our preliminary experience delivering virtual consultations as part of routine NHS care at Newham (supported by service development / evaluation grants from NHS Choices and Health Foundation) suggests that virtual consultations for young people are popular with both patients and staff and appear to increase engagement, regularise follow-up and reduce A&E attendances in a subset of hard-to-reach patients characterised by high 'DNA' rate and poor control. In addition, older people from minority ethnic groups find diabetes services difficult to access but many are 'Skype literate' (often because they have learnt this skill to keep in touch with relatives abroad) and keen to try remote consultations. Data on uptake of the virtual consultation service at Newham in 2011-13 are shown below.

- From 143 patients initially offered a webcam appointment in 2011/12, the overall acceptance rate was 62% across all ages and ethnicity. Below age 50, age did not affect uptake.

Patient ages	% agreed
Under 50	82%
50 - 59	64%
60 - 69	29%
70 – 79	11%
Total	62%

- 87 patients have now participated in webcam consultations with a total of 331 appointments and an overall DNA rate of 13%, a marked improvement over a baseline of 25% for these patients.
- Patient feedback from focus groups, questionnaires and interviews has been positive. It suggests improved access and patient satisfaction and suggested the potential of this service model (which must now be explored systematically) to improve engagement, self-management and confidence.

The Royal London HPB (Hepato-pancreato-biliary) Cancer service (led by a co-applicant on this bid, SB) is a tertiary service to which patients often have to travel long distances when unwell. 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 away. They have in common a life-threatening diagnosis, major surgery and a prolonged post-operative phase in which they have to cope with multiple physical, emotional and practical challenges. This clinical service has just begun to trial virtual consultations and all key staff are keen to develop it further. We hypothesise that after the initial face-to-face consultation, some aspects of pre-operative preparation and post-operative follow-up will be achievable by remote consultation. But cancer is a sensitive area so we remain open about the benefit-harm balance.

Sampling

The goal of sampling in the micro-level qualitative study is to capture the breadth of experience (of patients and staff) of the virtual consultation. We therefore seek a purposive sample of up to 30 diabetes consultations and up to 15 cancer consultations. The lower number in cancer is because there will be far greater practical and ethical challenges to gaining informed consent and avoiding harm, and we do not want to put excessive pressure either on the service as a whole or on individual patients, clinicians or researchers. Within each sub-sample, and with ethical considerations over-riding (see below), we will seek maximum variety in clinical, social, ethnic and personal circumstances, and in health and IT literacy. The way this is likely to play out is initially to invite all eligible participants but as cases accumulate, actively seek out those whose circumstances provide a contrast to those already included in the study.

Someone not involved in the study (eg a receptionist or nurse) will make the initial approach and provide patients with a letter of invitation and consent forms as they arrive for an outpatient consultation. A member of the research team will normally be on hand to respond to queries from patients or carers. Those wishing to hear more will be contacted by a researcher. A one-week (minimum) reflection phase will be included to give people time to think about the study before being contacted.

The goal of sampling in the meso level study is to map the people, interactions and organisational routines that support the virtual consultation with a view to building a rich ‘ecological’ picture of the socio-technical micro-system (and its wider embedding in the organisation) needed to make this model work as business-as-usual [68]. We will begin from the clinic where virtual consultations are held, and map the individuals and technologies involved there, then move outwards from this nexus to the trust’s corporate partners including estates, finance, clinical informatics (among others) in order to explore the organisational change required to embed online care within NHS services. The Chief Information Officer for the trust, CG, is a co-applicant on this bid and will assist specifically with this process mapping exercise including sampling and recruitment of interviewees.

To sample for the national level interviews, we will begin with Beverley Bryant who is Head of Strategy and IT at NHS England and use snowball sampling (asking each interviewee to nominate a colleague) to build up a picture of the national context. In addition, we will interview key informants at the Royal Colleges (Nursing, Physicians, Surgeons), the National Information Governance Board and the technology industry. Luke O’Shea, Head of Patient Participation, NHS England (who has viewed the Skype consultations at Newham) has also agreed to be interviewed.

Data collection: micro level

The core dataset will consist of video-recordings of consultations. The recordings will incorporate two video streams: what the clinician sees and does in the clinic, and what the patient sees and does at the remote site (the place where the patient chooses to consult from – typically bedroom or living room at home). See page 16 for ethical considerations. Using a technique we have successfully applied previously, we will record the clinician’s end of the consultations using our existing small digital camcorder (Sony® Handycam DCR-SR72), which has a wide-angle lens and remote control. We will use the same or equivalent technology for the patient end of the dataset. Good quality voice recordings can be achieved using the camera’s in-built microphone. The camera’s field of view will capture as much as possible of the individual and their orientation towards the screen, as well as relevant contextual detail in the room. The camera will be mounted on a mini-tripod a few inches high which will be positioned on a piece of furniture to minimize obtrusiveness (compared to, say, a freestanding full-sized tripod).

We will also capture clinician and patient interaction with the videoconferencing software and other tools used in the consultation. As in previous projects, we will use a commercially available screen capture software tool (ACA Systems) to record screen images showing on each party’s computer screen as a video file. This will be run directly from a USB memory stick. Setting up this technical equipment takes about ten minutes. The researcher will start and stop the recordings but will leave the room during the consultation and not interact with the patient or staff member until the consultation is over. When called back into the room, the researcher will check that they the patient and clinician are still willing for the video material to be used in the research and ask them to countersign the consent form to confirm this. Whilst this is considered good research practice, in our previous experience no patient has withdrawn consent at this stage.

We will begin recordings before the Skype connection is made by the clinician, so as to capture what each party does prior to making virtual contact, and we will stop the recording when called back into the room (which could be several minutes after the end of the consultation – for example if the clinician writes up notes afterwards). The resulting .avi file will be saved to the computer desktop in the first instance and transferred to an encrypted USB memory stick – a process we know takes approximately five minutes. Each end of the consultation will result in two digital files, one screen capture and one video. Video editing software (Adobe® Premier Pro CC) will be used to synchronise the two streams from one end of the consultation into one file such that the video of the computer screen can be played exactly in parallel with a video of the patient looking at the screen. We will then align the patient and clinician 'ends' in a single editable file. See page 16 for discussion of information governance and data management issues.

Data collection: meso level

To map the socio-technical microsystem that supports the virtual consultation, we will draw on the methodology described by Brown et al 'Mapping the Sociotechnical Healthcare Ecosystem', which combines a socio-technical approach (mapping the people and technologies involved) *and* a human ecology approach (placing particular emphasis on the relationships and interdependencies between these components) [68]. Data collection techniques are predominantly ethnographic, consisting of physically visiting the different departments (clinical, administrative, executive) and undertaking naturalistic interviews – that is, asking people on the job what they are doing and why they are doing it (since, as Barley and Kunda have shown, people are often unable to talk about the detail of their job unless they are actually doing it at the time [69]), as well as collecting key documentation such as standard operating procedures and any informal guides and notes made by staff to help them do their job. Naturalistic interviews will be guided by observations at the coalface of work. A meaningful 'prompt sheet' is impossible to prepare in advance and will be very different for (say) an IT technician than for a clerk or a nurse. Questions will include such open-ended prompts as

- 'Tell me about your job in relation to the virtual consultation project';
- 'What are you doing right now in relation to the virtual consultation project? Why are you doing it that way? Can you suggest any changes to make this aspect of the project go more smoothly?';
- 'Tell me a story of things that are going smoothly in this project. Tell me another story of an incident where things didn't go so smoothly'; and
- 'Is there anything else I should be asking you or asking other people involved in this project?'

The dataset for the meso analysis will thus consist of field notes (to be typed up and annotated as soon as practicable after the field visit), plus documents, charts and other artefacts supplied by staff.

Data collection: macro level

As noted above, one key purpose of the interviews at national level is to build relationships and generate interest in the study with a view to disseminating our findings subsequently. We understand that we are not allowed to make recommendations for policy, but capturing the perspective of national policymakers is key to a multi-level analysis of the contextual factors accounting for the success and potential transferability of this new service model. To achieve both these ends, we plan a small number of 'executive level' semi-structured interviews which will be done by a senior member of the team (TG, SV or CG). The provisional interview guide, which will be amended iteratively as findings emerge, is as follows:

- 'What in your view are the key drivers and facilitators for virtual outpatient consultations?'
- 'How has the policy to promote remote consulting been operationalised in your national organisation so far? What have been its key successes and disappointments? How can you explain each?'
- 'What do you see as the main challenges nationally to scaling up remote consultations so they become business as usual where clinically appropriate?'
- [if not raised spontaneously] 'What are the information governance challenges to virtual consultations? What activity is going on in your national organisation to address these?'
- 'Is there anything else I should be asking you or asking other people involved in this project?'

Data analysis: micro level

Dr Deborah Swinglehurst, whose PhD was supervised by TG, developed a methodology for researching clinical consultations with multi-channel video [70]. She says (p 86), *"The potential of video lies in its ability to access versions of conduct and interaction in everyday settings, explore how talk is inextricably embedded in the material environment and the bodily conduct of participants, and examine the ways in* *which objects and artefacts come to gain particular significance at particular moments – how material features are invoked, referred to, used, noticed, seen at particular moments for particular purposes [71].”*

Video data are inherently ambiguous. On the one hand, the video record is ‘factual’ and ‘real’ – but on the other hand it is not self-interpreting. Indeed, as with a film or play, it is open to multiple different interpretations which will be overlaid by the background and perspective of the viewer [72]. Video opens up the possibility to combine the analysis of different *modes* such as speech, bodily conduct, gaze and posture. Modes are culturally shaped resources for achieving meaning. A *multi-modal* approach is one in which attention is given to all the modes (ie there is a focus on what is said in parallel with the careful study of ‘body language’). Such multi-modal analysis attends to the “*complex repertoire of semiotic resources and organizational means that people make meaning through – image, speech, gesture, writing, 3-dimensional forms, and so on”* (page 1) [73]. Different aspects of meaning may be expressed by different modes, which may complement each other (or reveal contradictions that can be explored and unpacked).

Following Swinglehurst, we will apply both multi-modal linguistic ethnography and discourse analysis [70]. Note that such approaches do not offer any specific method that can be applied formulaically. Rather, they provide a number of ‘sensitising concepts’ [74] and tools which can be drawn upon in the analytical process. We will adopt a constructionist and performative perspective, considering how social action is accomplished in and through interaction, and how technology features in this. Central to the analysis will be consideration of the moment-by-moment shaping of interactions, the contingencies that arise when the technology is used in different ways at different times, and how participants orient to these contingencies.

The first step in analysis is transcription, which is an interpretive process involving both immersion in the data and ongoing judgements about what level of detail to include and how to interpret and represent the data (including non-verbal behaviour and body language from both speaker and listener); it is not simply a technical task [75]. While much of the consultation will be be transcribed conventionally (ie depicted as reported speech), selected sections will benefit from fuller transcription using the following conventions of conversation analysis taken from Swinglehurst [70], who draws on Atkinson and Heritage [76]:

[onset of overlapping speech; **]** end of spate of overlapping talk
[[speakers start a turn simultaneously
: preceding sound is lengthened or drawn out (more : means greater prolongation)
<u>Underlining</u> emphasis
(.) pause of less than 0.2 seconds; **(0.4)** pause, in tenths of a second
↑↓ marked rising / falling intonation
>text< the talk they surround is quicker than surrounding talk
°° the talk they surround is quieter than surrounding talk
.hhh inbreath; **Hhh** outbreath
= no pause between speakers; contiguous utterances
(( )) a non verbal activity (eg the notation ‘C’ might be used to indicate a keystroke)
(text) unclear fragment of text
. falling tone (not necessarily end of sentence); **?** rising inflection (not necessarily a question)
CAPITALS louder than surrounding talk
<text> the talk they surround is slower than surrounding talk

Conventional transcription will thus be used for most of the data, and conversation analysis (which is time consuming and impractical except for short segments) will be used judiciously for what might be termed ‘telling moments’ in the consultation. Furthermore, we will combine these with a more contemporary approach made possible by technical advances in video editing software, which is to omit the transcription stage altogether and work directly with video recordings. This approach is illustrated by the work of Pearce, who used digital markers (‘tagging’ software) as an aid to analysis so as to engage with his data directly rather than indirectly via a transcript [77]. This approach is very helpful, for example, when it is considered key to the analysis to repeatedly view the full video version of an excerpt.

Combining these approaches, we will familiarize ourselves with and selectively transcribe the consultations in our dataset, adding observations, analytical notes and reflections. We will apply the quadripartite (four-component) framework of SST illustrated in Figure 2. For each consultation, we will consider the following:

- the 'strategic terrain' (external network of position-practice relations pertinent to this conjuncture);
- relevant internal structures of patients and staff (especially what Bourdieu called 'habitus' – identity, values, internalised codes of practice, and particularly clinicians' perspectives on clinical excellence);
- material and symbolic properties of the technology and how these shape and constrain interaction;
- the immediate outcomes of the actions and interactions observed.

Data analysis: meso level

In applying Brown et al's framework for analysing the 'socio-technical healthcare ecosystem', we will use both diagrams and narrative as synthesising devices to draw together a visual representation and a linked verbal account of the key human and technical interactions and interdependencies on which the successful execution of the virtual consultation depends. To inform this mapping exercise, we will also draw on Feldman's notion of the organisational routine – defined as *"a repetitive, recognizable pattern of interdependent actions, involving multiple actors"* [78] – whose potential and use in the healthcare setting we have previously described theoretically in a BMJ review [79] and applied empirically in a study of how safety is collaboratively achieved in the repeat prescribing routine [33].

Routines are how organisational life is patterned. The ethnographic study of routines can illuminate how assimilation of innovations happens (or not). In studying routines for virtual consultations, we will identify and compare three things: artefacts such as protocols (Feldman's *proxy routine*); understandings held by staff of how this routine is or should be enacted (Feldman's *ostensive routine*), arrived at by asking "what gets done, by whom, and how?"; and the range of ways in which the routine is actually enacted (Feldman's *performative routine*), arrived at by direct observation. We will analyse the convergence and divergence between ostensive, performative, and proxy routines to reveal the tension between current business as usual and the new ways of working implied by a virtual consultation model.

Data analysis: macro level

Interviews with national stakeholders will be analysed to provide the wider context for understanding what is going on locally. In previous studies of small-scale encounters and organisational routines in healthcare we have found that staff refer (more or less accurately and usually vaguely) to such influences as 'national policy', 'NICE guidance', 'the law', 'my Royal College' and 'information governance regulations'. Data from direct interviews with national stakeholders, as well as documents recommended or supplied by them (along with their interpretations of these documents) will be compared with statements, actions and interpretations made by organisational actors. In this way, ambiguities will be surfaced and explored.

Synthesis of data from the different components of the study

Table 2 summarises the data sources and how these will be analysed and synthesised to provide a multi-level case study of the service across two sites, analysed from a SST perspective.

TABLE 2: Overview of data structure and planned analysis

Data source	Type and nature of data	1st-order interpretation	Higher-order categories
Descriptive and demographic data on the video consultation service in two settings (diabetes, cancer)	Number of patients offered video option and proportion who accept and persist with it Start and finish time 'DNA' (did not attend) rate for video and face to face options Unscheduled encounters (eg A&E) for index condition	➢ Acceptability/popularity of the service ➢ Demographic data eg uptake by age ➢ Failed encounter rate ➢ Risk of missing serious problems (estimate) ➢ Consultation length	Background and context to the multi-level qualitative analysis Could inform economic modeling for future service and/or a future cost-effectiveness study

Micro-level study of 45 clinical consultations (30 diabetes, 15 cancer)	Video recording and screen capture (patient end) Video recording and screen capture (clinician end) Researcher field notes from before / after the consultation, at patient and clinician end	➢ What is said and done in the consultation ➢ Unfolding interaction ➢ How technology shapes and constrains the consultation ➢ How participants felt	External social structures such as ➢ Political and economic context ➢ Professional standards and definitions of excellence ➢ Symbolic meaning of illness Internal social structures (what actors 'know' and how they interpret the strategic terrain) ➢ 'Scripts' held by patients and staff of how they should behave and how they change over time ➢ Skills & techniques for using the technology, how these change Assumptions built into technology ➢ About capabilities of users ➢ About how people interact ➢ About privacy and consent ➢ Interplay between these factors
Meso-level study of the socio-technical microsystem in each setting	People and technologies involved in delivering the virtual consultation Diagrams and accounts of how these relate and interact	➢ Key interactions and interdependencies ➢ Key organisational routines and how these are changing over time	
Macro-level study of wider context for introducing video consulting	Perspective of national stakeholders Documents supplied by these	➢ Historical and policy drivers for the move to virtual consultations	

The intervention component

Whilst the main focus of this study is on generating transferable new knowledge about the nature of video consultations and how these may be routinized in NHS organisations, we have included an action research component. We will work with local senior managers and commissioners to understand the organisational change required to embed the video option. We will bring staff together six monthly, for a consolidating learning workshop, including gathering feedback from all those involved in, or impacted by, the video consultation model across all levels of the trust and its linked commissioning GPs.

The team involved in this research

The principal investigator is TG, an academic GP who developed this bid in collaboration with SV, a diabetologist with a commitment to improving services for disadvantaged groups and an interest in applied research. SV (who is an Honorary Senior Lecturer at Barts) conceptualised and developed video consulting as an NHS service at Newham. A strength of this bid is the true academic-service partnership between TG, SV and other staff listed below. Many have been working together on diabetes projects in Newham for some 15 years and have mobilised additional new partners to bring key skills and networks to this project.

The other academics on the team include SS, a social scientist and Senior Lecturer in Health Policy. In recent years she has been particularly focused on large scale change in the NHS and has led NIHR-funded organisational case studies (via Nuffield Trust) on NHS commissioning. She is skilled and experienced in all the qualitative techniques to be used in this study except for technical aspects of video capture and editing (covered by other team members). Also on the Barts team are two computer scientists: JW, a psychology graduate with a PhD in Human-Computer interaction, and EB, who has a PhD in software engineering and now works freelance as a science writer, with a particular interest in public understanding of technology.

Newham Diabetes Team includes JM, a senior research manager with many years' experience running applied research in this trust (including detailed knowledge of the internal financial processes, ethics and R&D procedures and patient and public involvement, plus a PhD in health services research); and PH, a diabetologist who has some research experience and who runs the antenatal diabetes service from which we hope to recruit participants. At the Royal London Hospital site, the team includes SB who leads the HPB Cancer service and is a member of the Hepatobiliary Pathway Board for London Cancer, and CG who is the Chief Information Officer for Barts Health Trust (covering both Newham and the Royal London). CG was previously seconded to Department of Health as clinical champion for new technologies in the NHS.

The team also includes IH, GP commissioning lead for diabetes services in Newham, who will be pivotal to the roll-out and long-term funding of the service should this study demonstrate benefit. Finally, AC is an independent advisor and freelance researcher with a PhD in anthropology who has lived and worked in East London on community development projects for over 20 years; she is well connected with patient and public involvement groups and experienced in different methods of public engagement and communication.

Dissemination and projected outputs

As explained above, this study is investigating a service model that is already being promoted at the highest level by politicians despite having a weak-to-non-existent evidence base. Whilst we, like the Right Honorable Mr Hunt, feel intuitively that video consultations 'work', we are committed to undertaking a robust study from a position of scientific equipoise. How we go about disseminating our findings is likely to be influenced by whether our study confirms expectations (that this is a worthwhile service model and potentially both practicable and cost effective in the NHS context) or whether our detailed analysis reveals unexpected disbenefits or even harms associated with it.

A key element of the research design is to draw national policymakers into the study at an early stage via key informant interviews and the macro level analysis. We have already been to see Beverley Bryant who is Director of Strategic Systems and Technology at NHS England who is happy to be part of the project *(She emailed: "Dear Trish, Skype and other e-consultations are a key deliverable in our Digital Primary Care programme so I'd be happy to be named on your application. When you've landed it, I'll put one of my team onto working with you to help look into the macro factors.")*. Ms Bryant and her policy contacts will be strategically placed to implement findings when these emerge. As noted above, we will use our steering group to help create widespread interest in the study and appetite for the findings as the research unfolds.

Dissemination will be a rolling agenda item for the steering group from the start, and will be led from the front (the PI, Prof Greenhalgh, is Dean for Research Impact at Barts so will take personal responsibility for keeping dissemination / knowledge translation on the agenda). Because there is already political interest in the study, we will be cautious about releasing interim findings but we anticipate being able to use a wide network of colleagues in academia, policy, and NHS service to disseminate findings once all the data have been analysed and conclusions agreed and signed off by the steering group.

We plan to produce the following specific outputs:

1. PATIENTS AND PUBLIC: Lay summary for the VOCAL website. Leaflet and pdf download 'what to expect in your virtual consultation'. Twitter feed. End-of-project workshop for service users seeking to use Skype (and user organisations seeking to support such use).
2. SERVICE: Provisional guidance for NHS staff on effective virtual consulting (provisional because the study design does not allow conclusions to be drawn across all clinical areas), developed in collaboration with Royal Colleges in the style of their existing guidance on social media and email.
3. POLICY: Succinct summary of key findings for local and national policymakers, via an article in Health Service Journal (widely read but paywalled) and a summary in an open-access format (eg by offering a guest blog on a website such as the LinkedIn page of the Faculty of Medical Leadership and Management – though others may become available by the time this study ends).
4. ACADEMIC: Detailed final report for NIHR. Main methods/findings paper in an open-access, high-impact journal (preferably, NIHR's own new journal 'Health Services and Delivery Research'). Specialist methods paper on the challenges of using conversation analysis in the setting of virtual consultations. Suggestions for further research.

Project management

We plan to use a management model with proven success, familiar to the majority of the team who have worked together previously: a core working group that meets fortnightly, a 6 monthly independent steering group (SSC) and a patient advisory group. This infrastructure is intended to support (but not replace) regular meetings among the researchers, as needed, to discuss emerging findings and conduct the data analysis.

The **core working group** will include JM, JW, SV, TG, the research nurse and an administrator. Other co-applicants will attend the working group when relevant, including those working on different sites. The group will meet at different locations but individuals will join the meeting via Skype if they cannot attend in person. The core working group will be responsible for:

- monitoring day to day progress
- reviewing budgets
- reviewing quality of outputs
- management of risks and issues
- communication plan

The **steering group** (independent study steering committee) will have wide cross-sector stakeholder representation (including patients from the patient advisory group and other NHS professionals), and will monitor progress against milestones and budgets, review outputs, provide advice, promote the project and communicate with stakeholders.

The **patient advisory group** will be set up and facilitated by AC, once established it will have a lay chair. The group will provide advice and feedback to the working group and representatives will attend the wider steering group (supported by AC if required).

JM is an experienced and highly trained **project manager** (with a PhD); she will draft the project documentation in close discussion with TG / SV and the core working group; this will include clarifying the brief, roles and responsibilities, terms of reference, communication plans and so on.

Approval by ethics committees

We do not anticipate major problems or delays with gaining REC or R&D approval because we have already gained permission for all processes and procedures being proposed here in previous pilots or other research studies and have detailed documentation including consent forms and information sheets. In particular, the MRC-funded HERO study and Dr Swinglehurst's PhD linked to that study used video recording of clinical consultations and conversation analysis of those. We understand that a new REC would look at the study afresh but we feel confident that any hurdles will be surmountable. We already have REC exemption (because it is deemed service development) and R&D approval for our current Health Foundation funded development project (DREAMS) of Skype consultations in diabetes. Below, we outline the main ethical issues which we would raise and address on a REC application form.

The data to be collected for the micro level study in VOCAL are highly personal and sensitive, hence the utmost care must be taken to obtain and maintain informed consent. Consent forms will incorporate 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 [80]. The researcher will arrive at the patient's chosen venue (usually their home) at least half an hour before the booked time slot so as to explain the procedure again, confirm consent and get this in writing, and informally discuss the patient's hopes, fears and expectations for the consultation. Another researcher will seek similar consent from the health professional at the clinic base.

Another ethical issue is data management and governance. Videos of consultations are almost impossible to anonymise fully, even with pixilation. We will follow the stringent protocol developed by Dr Swinglehurst for her PhD under TG's supervision and described in detail in her thesis [70]. This protocol has been approved by the Information Governance Committees of our respective organisations and also by two previous RECs. As well as strict encryption of portable data sticks and never placing the data on networked computers, it includes the procedure that following recording of a video consultation, the researcher will delete the [temporary] desktop file and 'empty trash' to ensure permanent deletion from the local machine.

Patient and public involvement

Patients and their carers are key stakeholders, and much of this work has been initiated or developed as a result of input from them. User input has been obtained from three focus groups, online questionnaires and patient surveys (telephone and face to face). While online consultations have been very well received by them and they have appreciated the benefits (access, convenience, impact on self-management) they have also raised important concerns (e.g. one patient was concerned about the possibility of someone else in the room with the clinician during an online consultation, present but not visible to the patient).

1. We propose to invite representative users from the various diabetes groups (including those using Skype and those who declined, women who have recently had pregnancy) and those attending the HPB unit or their carers to 6 monthly Patient Advisory Group meetings. These will be facilitated by Dr Anna Collard, social anthropologist and Projects Co-ordinator for the Forum for Health & Well Being.
2. We will ask patients from the advisory group if they would be happy to review key documents as the study progresses; we have included a budget for extra work undertaken outside of advisory group meetings.
3. We have identified a lay chair to lead the independent study steering committee (SSC) which will meet 6 monthly. We also aim to recruit at least one patient from the advisory group to attend the SSC meetings
4. Patients will be included in the leaning workshops (6 monthly)
5. We will also incorporate patient feedback from the online discussion forum.

The project team have wide links with various user groups through a highly skilled local Bilingual Health Advocacy team who have worked with us on numerous research projects over the past 15 years.

GANTT chart

		Year 1						Year 2						
Month	before start	Jan 2015	Mar 2015	May 2015	Jul 2015	Sep 2015	Nov 2015	Jan 2016	Mar 2016	May 2016	Jul 2016	Sep 2016	Nov 2016	12 m after end
MANAGEMENT AND GOVERNANCE														
Appoint staff	▨													
Ethics & Governance approvals	▨													
Establish groups with TOR: steering group, core working group & patient advisory group	▨	▨												
Engage stakeholders including user groups	▨	▨	▨											
Development of VOCAL website		▨	▨	▨										
Patient advisory, and involvement, groups		x			x			x			x			
Cross-sector steering group meetings / board, including service users from advisory group			x			x			x			x		
Project team meetings (fortnightly)		X 4	X 4	X 4	X 4	X 4	X 4	X 4	X 4	X 4	X 4	X 4	X 4	
RESEARCH														
(1) MICRO														
Recruitment of patents to virtual consults	▨	▨	▨	▨	▨									
Purposively recruit maximum variety sample to participate in research			▨	▨	▨									
Collect datasets: video recording and screen capture, field notes (n = 30 – 45)			▨	▨	▨	▨	▨	▨	▨	▨				
Synchronise data sets, transcribe, analyse and apply theoretical frameworks				▨	▨	▨	▨	▨	▨	▨	▨			
Write-up case narratives (n=30-45)				▨	▨	▨	▨	▨	▨	▨	▨			
Cross-case analyses for summary of themes					▨	▨	▨	▨	▨	▨	▨	▨		
Incorporate learning and feedback from patient advisory group and online forum							▨	▨	▨	▨	▨	▨		
(2) MESO														
Mapping key steps and players at organisational level		▨	▨	▨	▨	▨	▨							
Ethnographic observations, naturalistic interviews, gathering field notes, documents, informal guides, notes etc			▨	▨	▨	▨	▨	▨	▨	▨				
Consolidating learning workshops users & staff impacted by Skype and/or web appts				x			x			x			x	
Analysis, testing of emerging findings and relate to theoretical frameworks				▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	
Write-up case study reports for the two services (diabetes and cancer surgery)									▨	▨	▨	▨		

(3) MACRO														
Recruit national stakeholders to interview (snowball sampling)		▨	▨	▨	▨	▨	▨	▨	▨					
Conduct semi-structured interviews, gather documents			▨	▨	▨	▨	▨	▨	▨					
Analysis of interview transcripts and documents				▨	▨	▨	▨	▨	▨	▨	▨			
Feedback from stakeholders on analysis outcomes										▨	▨	▨	▨	
DISSEMINATION														
Identify target audiences		▨												
Draft dissemination / communication plan		▨												
Feedback to, and dialogue with, service user groups (with NHS bilingual health advocates)			▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨
Ongoing feedback to emerging project (through steering group, team meetings, patient advisory groups, online discussion forum, website)				▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨
Twitter feed				▨	▨	▨	▨	▨	▨	▨	▨	▨	▨	▨
Final dissemination workshop (combined with final learning workshop)													x	
OTHER OUTPUTS / DISSEMINATION														
Final report, with lay summary													x	
Provisional guidance for NHS staff on effective virtual consulting													x	
Succinct summary of key findings for local and national policymakers via HSJ & open access journal (as well as through direct contacts)														x
Main methods/ findings paper in an open-access, high impact academic journal														x
Specialist methods paper														x
Presentation at minimum of two conferences														x x

List of project milestones

By January 2015	Ethics approval gained; steering and patient advisory groups established; all patient-facing staff have honorary contracts in NHS organisation
By March 2015	Launch patient advisory group held; detailed methodology and work plan established for remote consultation data collection
By May 2015	Launch cross-sector steering group meeting held; internal document mapping stakeholder perspectives and expectations;
By July 2015	Project website launched; Internal research summary of 5 in-depth case studies and cross-case themes; First workshop with service staff held; Internal research summary of the impact on care practice and organisational processes;
By September 2015	Internal research summary of 10-15 in-depth case studies; updated summary of themes and emerging lessons for Skype consultations; Preliminary internal summary report on stakeholder and policymaker interviews
By Jan 2016	Internal research summary of 15-20 in-depth case studies; Second workshop with service staff held; Updated summary of themes and emerging lessons for Skype consultations;
By May 2016	Internal research summary of 25-35 in-depth case studies; Preliminary internal report on cross-case comparison between the two NHS services (diabetes and cancer)
By July 2016	Internal research summary of 30-45 in-depth case studies; Third workshop with service staff held; Final internal report on cross-case analysis of the two NHS services (diabetes and cancer);
By September 2016	Final report on case examples, key lessons and guidelines for NHS services; Summary report and guidelines circulated to service providers and policymakers; lay summary placed on website;
By January 2017	Final report submitted to NIHR; Final workshop with NHS partner staff Two academic papers submitted (one on methodology and one on methods and key findings);

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