Chapter 5: Virtual consultations (micro level)

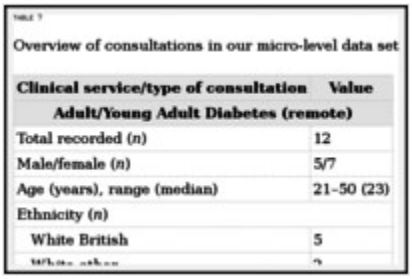
This chapter focuses on our analysis of the clinician–patient interactions. We present our initial analysis of virtual consultations via Skype within the Adult/Young Adult Diabetes, Antenatal Diabetes, and Hepatobiliary and Pancreatic Cancer Surgery services at Barts Health NHS Trust. We then present a detailed, micro-level analysis of those virtual consultations and comparator face-to-face consultations.

This chapter should be read in conjunction with the methods section on micro-level analysis and use of the RIAS in *Chapter 2*.

Description of the data set

Obtaining video and audio-recordings of both ends of a virtual consultation raised substantial logistical, technical and ethics challenges. Two researchers were often needed – one to record in the clinic and the other to attend the patient's home (perhaps many miles away). Patients (and staff) were usually, but not always, happy to have a researcher set up the video camera and then leave the room while the consultation took place. Whereas the pilot phase consultations were relatively easy to set up to include data collection for research (because they were undertaken outside regular clinic hours), once video consultations became 'business as usual', it was much harder for staff to find sufficient time to recruit potential research participants and alert the research team to a planned video consultation. In addition, as noted in *Evolution of virtual consultation services over the study period*, a significant proportion of video consultations in the Adult/Young Adult Diabetes clinic were ad hoc (undertaken spontaneously when the patient sent a SMS Skype message when they saw the clinician was online, or fitted in informally by the clinician as a 'quick follow-up'); these were impossible to schedule in advance for video recording.

Our target had been to obtain at least 30 high-quality recordings of complete virtual consultations (20 in Diabetes, including Antenatal, and 10 in Cancer Surgery); we also sought to collect a sample of comparator face-to-face consultations. At the end of the study, in July 2017, we had collected recordings of a total of 30 remote and 17 face-to-face consultations (*Table 7*).



Overview of consultations in our micro-level data set

Clinical service/type of consultation	Value
Adult/Young Adult Diabetes (remote)	
Total recorded (*n*)	12
Male/female (*n*)	5/7
Age (years), range (median)	21–50 (23)
Ethnicity (*n*)	
White British	5

TABLE 7

Overview of consultations in our micro-level data set

As detailed in *Chapter 2*, the RIAS analysis was undertaken on a subset of the data set in which virtual and face-to-face consultations were matched as closely as possible for clinical content and (in all cases) for clinician; the subsample consisted of 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) and 10 Cancer Surgery appointments (five remote and five face to face). Patients for virtual consultations had been purposefully selected and recruited by the clinician involved, based on their assessment that a virtual consultation would be safe and appropriate. As summarised in *Table 7*, patients having virtual consultations within the study were more likely to be of white British ethnicity (the same ethnicity as the clinician), but were of a similar age to those having face-to-face consultations. The ethnic differences probably reflected the fact that some Diabetes and Antenatal Diabetes patients were limited English speakers, which was considered to be too risky at this early stage in the evaluation of virtual consultations.

Our initial analysis of the virtual consultation data, based on repeated watching of the merged audio and video streams (which could be viewed in parallel on screen), identified the following five overarching themes (we explore these in more detail below).

Technical set-up and preparation

Virtual consultations usually required a technical set-up phase immediately before the consultation could begin, on both the patient's and the clinician's computers, to resolve audio/video issues, connectivity and accessing the application. This often (but not always) involved collaborative interactions to work around unanticipated problems (e.g. ensuring that both parties could see and hear each other) and resolve technical issues (e.g. regarding broadband connection). Sometimes, the technical set-up phase included informal and ad hoc technical assistance from the clinician to the patient (and, in several cases, from the researcher during set-up of the consultation). Technical problems were always either resolved or worked around, with none of the virtual consultations recorded within the study failing or being abandoned as a result of technical issues.

Materiality work

Face-to-face consultations were characterised by shared physical space and material objects; patients and clinicians typically engaged together with numerous physical artefacts as consultations unfolded. For example, in a diabetes consultation, the patient would typically bring a paper diary (or smartphone) with blood glucose readings and share it across the corner of the consulting desk; the clinician might share the paper record with the patient to discuss a test result, or draw a diagram on a scrap of paper to help explain a medical issue. Antenatal patients carried a patient-held paper record.

In remote consultations, patients and clinicians interacted with various artefacts and resources to support dialogue, clinical reasoning and documentation, and in an attempt to overcome a lack of

physical co-presence. For instance, our data set included frequent reference to existing electronic and paper records (at both the patient end and the clinician end), interaction with medical devices (e.g. insulin pump), paper or electronic diaries (to schedule or confirm upcoming appointments) and note-taking (e.g. to record an agreed change in insulin dose). Patients and clinicians together developed strategies to overcome the absence of shared physical objects and spaces (e.g. patients read aloud their insulin dosages and blood glucose readings, while the clinician wrote them down on the paper record).

Different kinds of talk

Both face-to-face and remote consultations involved different kinds of talk (see *Table 2* in *Chapter 2* for a full list of how the RIAS classifies these). For example, we distinguished between task-focused clinical talk (such as exchanging information about the condition and its investigation and treatment, educating the patient) and socioemotional talk (e.g. social conversation, showing concern or reassurance). Our interviews with both patients and clinicians had identified a widespread perception that virtual consultations involved less social 'chit-chat' and more task-focused clinical talk than face-to-face consultations, and that this was (in their view) why virtual consultations were typically shorter.

Shared knowledge and common ground

It was clear from our initial analysis of virtual consultations that some flowed better than others and that a small fraction of consultations in our data set appeared to be awkward and disjointed, with parties frequently misunderstanding one another and/or needing to seek clarification. This was an important finding, given the concerns raised by some clinicians and patients that a remote consultation would never (or rarely) achieve the quality of interaction possible in a face-to-face consultation (described by some participants as 'high bandwidth'). The content and flow of most virtual consultations in our data set appeared to be of high quality, and these features appeared to be related to the degree of shared knowledge and common ground between the patient and clinician. Effective communication seemed to follow from an existing, positive interpersonal relationship.

Interruptions and repair work

Virtual consultations presented new possibilities for interruption during the consultation. This included disruptions related to the technology (e.g. loss of audio quality, an incoming call on the mobile device being used for the consultation), as well as non-technological interruptions in the domestic environment (e.g. visitors or family encroaching on the consultation).

We explored these initial five themes in more depth by focusing on a subset of virtual consultations that were selected because they all focused on the same clinical issue (follow-up of

the antenatal patient with diabetes), and comparing these with a sample of face-to-face consultations (also in Antenatal Diabetes). The rationale for selection was that such consultations tended to involve young people with few or no comorbidities, and they followed a standard pattern and did not involve a physical examination. Hence, any differences (in talk and interaction) between face-to-face and virtual consultations were more likely to be attributable to technical and material factors rather than clinical confounders. We later extended the same detailed analysis to the other consultations in our data set.

The hypothesis-driven questions we derived from our initial analysis of Antenatal Diabetes consultations were as follows:

- Question 1: are virtual consultations (which are perceived by clinicians and patients to be shorter and more 'to the point') actually shorter and more task oriented?
- Question 2: how do virtual consultations differ from face-to-face ones in the kind of talk that occurs (apart from technology-related talk)? To what extent can these differences be explained by technical and material influences?
- Question 3: what kinds of technology-related talk occur in virtual consultations?
- Question 4: do remote consultations contain more breaches in conversation (e.g. requiring checking of understanding, repairs and so on) than face-to-face ones? What characterises those consultations that have a high proportion of such breaches? To what extent do 'shared knowledge and common ground' protect against such breaches?
- Question 5: how do interruptions (technical, domestic) impact on the flow of conversation in virtual consultations?

To address these questions, we then applied the RIAS, as described in the micro-level analysis section in *Chapter 2*.

Findings from our analysis using the Roter interaction analysis system

In the VOCAL study, we found that the RIAS proved to be useful in highlighting the different kinds of talk in virtual consultations and exploring how the technology influenced, and was influenced by, the interactions and dynamics between patients and clinicians.

In order to interpret the RIAS analysis, a broad understanding of the categories is needed (see *Table 2* for a detailed breakdown). In summary, guided by the RIAS and additional work applying the coding framework to telemedicine,[175] all talk and behaviour in virtual consultations in the VOCAL study were classified according to the following categories:

- socioemotional (broadly capturing talk related to social etiquette, indicating interest or understanding, concerns or attempts to reassure and negative talk)
- task focused (broadly capturing talk to instruct or guide, question-asking, information-giving, checking for understanding, requests and counselling in the form of giving instruction or advice to the patient)

- process oriented (relating to verbal interactions aimed at supporting the flow and direction of the conversation)
- technology related (any of the above, but relating specifically to the technology and/or its use).

The results presented below are based on a detailed micro-level analysis of 34 consultations in three different clinical contexts to explore how the use of Skype for virtual consultations affects the interaction and dialogue of the medical encounter. This includes 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) and 10 Cancer Surgery appointments (five remote and five face to face). The consultations were all follow-up appointments after the patient had met the clinician at least once. In the Antenatal Diabetes context, that appointment took place approximately 1 week beforehand to establish a schedule for insulin dosing. In the Adult/Young Adult Diabetes clinic, the consultation formed part of a routine 6-monthly review to discuss the patient's condition, recent test results and treatment plan. For the Cancer Surgery, the consultation formed part of the follow-up assessment of the patient's postoperative recovery and review of medical tests (blood tests, 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).

As detailed in *Chapter 2*, patients for virtual consultations had been purposefully selected and recruited by the clinician involved, based on their assessment that a virtual consultation would be safe and appropriate. 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 remote consultation option. As summarised in *Table 7*, patients having virtual consultations were more likely to be of white British ethnicity (the same ethnicity as the clinician), but were of a similar age to those having face-to-face consultations. The ethnic differences probably reflected the fact that some Diabetes and Antenatal Diabetes patients were limited English speakers, which was considered too risky at this early stage in the evaluation of virtual consultations.

Question 1: are virtual consultations shorter and more 'to the point' than face-to-face ones?

Consultation length (defined by the RIAS as frequency of utterances) was shorter for virtual consultations than face-to-face consultations across all three clinical settings. There was a small difference in consultation length in the Adult/Young Adult Diabetes service, with virtual consultations being slightly shorter in terms of the number of utterances for virtual consultations [median = 337, interquartile range (IQR) = 112.5] than face-to-face consultations (median = 366, IQR = 93.8), and in terms of duration (19:40 minutes vs. 20:10 minutes). These differences were not statistically significant for length ($U = 10.0$; $p = 0.20$) or duration ($U = 18.0$; $p = 0.10$). In the antenatal setting, there was little difference in the length of virtual consultations (median = 167,

IQR = 125.5) and face-to-face consultations (median = 168, IQR = 76.3). The duration of consultations measured in minutes showed virtual consultations to be slightly shorter (7:38 minutes) than face-to-face consultations (8:13 minutes), although this difference did not reach statistical significance ($U = 15.0$; $p = 0.63$). In the Cancer Surgery clinic, virtual consultations were non-significantly shorter in duration (11:50 minutes for remote consultations vs. 19:40 minutes for face-to-face consultations, $U = 6.0$; $p = 0.23$) and had a (non-significantly) lower number of utterances (median = 192, IQR = 69.5) than face-to-face consultations (median = 217, IQR = 142.5, $U = 9.0$; $p = 0.47$).

A consultation that is 'to the point' would focus predominantly (although certainly not exclusively) on task-oriented clinical talk. *Figures 9–11* show the overall proportion of types of talk for virtual and face-to-face consultations across the three clinics, according to the coded RIAS clusters. Taken together, they show that, aside from a small proportion of time spent on technology-related matters in virtual consultations, the proportions of talk were very similar across both kinds of consultation – although this may be partly attributable to the fact that the patient samples for virtual and face-to-face consultations were closely matched for type of condition and type of appointment. As noted above, the ad hoc consultations (which addressed a very different patient group – 'hard to reach', with unstable or complex needs, and/or seeking urgent input from the clinician) were not captured in our micro-level data set.

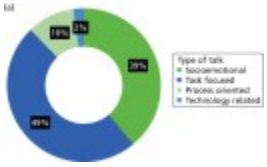


FIGURE 9

Types of talk in the Adult/Young Adult Diabetes clinic. (a) Virtual consultations; and (b) face-to-face consultations.

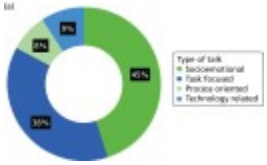


FIGURE 11

Types of talk in Cancer Surgery. (a) Virtual consultations; and (b) face-to-face consultations.

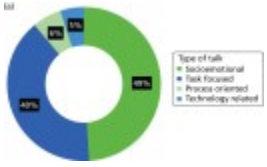
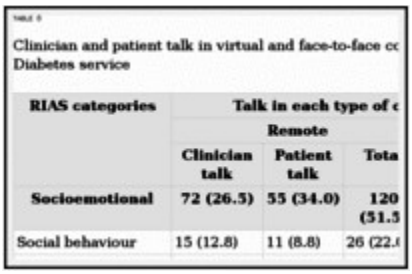


FIGURE 10

Types of talk in Antenatal Diabetes. (a) Virtual consultations; and (b) face-to-face consultations.

These proportions are illustrated in more detail for the three clinics in *Tables 8–10*, which compare the frequencies of socioemotional talk, task-focused clinical talk, process talk and technology-related talk in virtual and face-to-face consultations.

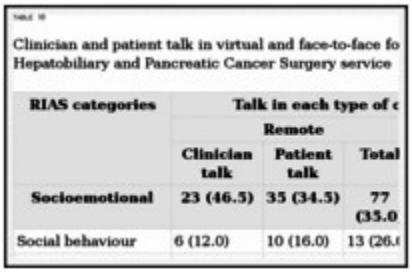


Clinician and patient talk in virtual and face-to-face cc
Diabetes service

RIAS categories	Talk in each type of c		
	Remote		
	Clinician talk	Patient talk	Tota
Socioemotional	72 (26.5)	55 (34.0)	120 (51.5
Social behaviour	15 (12.8)	11 (8.8)	26 (22.(

TABLE 8

Clinician and patient talk in virtual and face-to-face consultations in the Adult/Young Adult Diabetes service

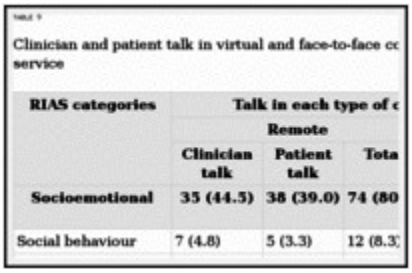


Clinician and patient talk in virtual and face-to-face fo
Hepatobiliary and Pancreatic Cancer Surgery service

RIAS categories	Talk in each type of c		
	Remote		
	Clinician talk	Patient talk	Total
Socioemotional	23 (46.5)	35 (34.5)	77 (35.0
Social behaviour	6 (12.0)	10 (16.0)	13 (26.(

TABLE 10

Clinician and patient talk in virtual and face-to-face follow-up consultations in the Hepatobiliary and Pancreatic Cancer Surgery service



Clinician and patient talk in virtual and face-to-face cc
service

RIAS categories	Talk in each type of c		
	Remote		
	Clinician talk	Patient talk	Tota
Socioemotional	35 (44.5)	38 (39.0)	74 (80
Social behaviour	7 (4.8)	5 (3.3)	12 (8.3)

TABLE 9

Clinician and patient talk in virtual and face-to-face consultations in the Antenatal Diabetes service

Across the three clinics, the most common kinds of talk for clinicians and patients in both face-to-face and virtual consultations were verbal attentiveness and information-giving.

Clinicians exhibited more socioemotional talk in virtual consultations than face-to-face consultations, which challenges the hypothesis that virtual consultations are perhaps more ‘to the point’.

The dominance of talk (i.e. who spoke more) was calculated by dividing the number of utterances for clinician talk by the number of utterances for patient talk. In the Adult/Young Adult Diabetes consultations, clinician dominance was the same in face-to-face (median = 1.2, IQR = 0.7) and virtual consultations (median = 1.2, IQR = 0.6). In the Antenatal Diabetes clinic, consultations were slightly clinician-dominated, but less so for virtual consultations

(median = 1.2, IQR = 0.3) than face-to-face consultations (median = 1.7, IQR = 0.5) – a difference that was statistically significant ($U = 3.5$; $p = 0.018$). The Hepatobiliary and Pancreatic Cancer Surgery clinic showed a greater level of clinician dominance for face-to-face consultations (median = 1.4, IQR = 0.5) than for virtual consultations (median = 1.3, IQR = 1.8), but this was not statistically significant ($U = 10.0$; $p = 0.59$). The one difference that was statistically significant was probably attributable to the fact that patients in virtual Antenatal Diabetes consultations spent some time reading out their blood glucose results to the clinician.

There was no significant difference between virtual and face-to-face consultations in 'directedness' (what the RIAS calls the ratio of clinician-to-patient 'control' over the consultation, and which was calculated by dividing the patient's biomedical questions and biomedical information from the clinician by the clinician's closed questions, directions and biomedical information from the patient). The average directedness score was 0.82 for face-to-face consultations and 0.83 for virtual consultations in the Antenatal Diabetes setting, 0.5 for face-to-face consultations and 0.7 for virtual consultations in the Adult/Young Adult setting, and 0.9 for face-to-face consultations and 1.0 for virtual consultations in the Cancer Surgery follow-up setting (none of these differences was statistically significant). These figures suggest that differences in directedness between clinical conditions (and linked to a particular clinician's style of consulting) appear to be far greater than any differences associated with the virtual technology.

Question 2: how do virtual consultations differ from face-to-face ones in the kind of non-technology talk that occurs?

The main finding from our RIAS analysis was that broadly similar kinds of talk occurred in similar proportions in virtual and face-to-face consultations. To explore that in finer detail, we removed 'technology talk' from the analysis and compared a broader range of categories of talk across patient and clinician talk in virtual and face-to-face consultations. The findings are presented in *Figure 12*.

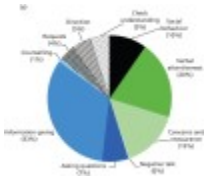


FIGURE 12

Total patient and clinician talk, with technology talk removed from remote consultations. (a) Remote consultations; and (b) face-to-face consultations.

Notwithstanding the small sample size (which could have concealed real differences between the two modes of consulting) and excluding technology-related talk, the only significant differences that emerged related to the following areas: 'personal talk' (constituent category for 'social behaviour'); 'verbal attentiveness' (a subcategory of socioemotional talk); direction and orientation (subcategories of process talk); counselling, requests and exchanging and sharing

information (subcategories of clinical task-oriented talk); pauses and silence; and achieving closure. We consider these in turn.

Social behaviour and personal talk

Across all clinical settings, the number of utterances related to the social behaviour category was slightly higher for virtual consultations (median = 17, IQR = 15.5) than face-to-face consultation settings (median = 14, IQR = 31.5), but there was no significant difference across the 34 cases ($U = 138.5$; $p = 0.84$.) Analysis of the subcategories within this cluster revealed a significantly higher proportion of utterances for 'personal talk' (e.g. 'hello', 'how are you'?) during virtual consultations (median = 9, IQR = 4.0) than during face-to-face consultations (median = 4, IQR = 5.8) in the antenatal setting only ($U = 4.0$, $p = 0.02$). This difference may be partly explained by the fact that the initial interaction between the patient and the clinician in face-to-face encounters is done in the waiting area and during the walk to the consultation room (in other words, the difference was probably spurious). There was very little 'chit-chat' in either virtual consultations or face-to-face consultations in this context of Antenatal Diabetes follow-up. This may have been because of high patient numbers – a clinician typically saw 30–35 patients per clinic – and to the likely absence of an established or prolonged relationship (since most patients had recently diagnosed gestational diabetes). Personal talk in this context largely consisted of social gestures and niceties (e.g. 'how are you?', 'bye', 'see you soon'), rather than social conversation. For instance, establishing a Skype connection (and 'popping up' on each other's computer screens) would sometimes lead to laughter, greetings and waving.

Verbal attentiveness

Across the three clinics, clinicians presented more verbal attentiveness talk (in the form of agreement and back-channelling) for virtual consultations (median = 24, IQR = 20.5) than for face-to-face consultations (median = 17, IQR = 14.0), but this difference was not statistically significant ($U = 115.0$; $p = 0.31$). Conversely, patients presented more verbal attentiveness in face-to-face consultations (median = 37, IQR = 26.0) than in virtual consultations (median = 26, IQR = 14.0), which was statistically significant ($U = 87.5$; $p = 0.02$). The change in proportion of verbal attentiveness may be an artefact of the difference in talk dominance (see the discussion in *Question 1: are virtual consultations shorter and more 'to the point' than face-to-face ones?*) and also indicates (through the higher proportion of clinician back-channel talk) that the patient is more likely to take the floor and lead on information provision when communicating virtually.

Direction and orientation

Clinicians gave more direction talk during face-to-face consultations (median = 8, IQR = 9.0) than during remote consultations (median = 6, IQR = 11.5), but this difference was not found to be significant ($U = 98.0$; $p = 0.11$). However, analysis of the different clinic settings showed that the clinician in the antenatal setting did present significantly more direction talk during face-to-face consultations (median = 8, IQR = 8.8) than during virtual consultations (median = 2, IQR = 1.5, $U = 0.05$; $p = 0.01$). Analysis of the subcategories showed that this difference was attributable to a significantly higher occurrence of 'transition' statements by the clinician during face-to-face consultations in the Antenatal Diabetes setting (median = 7, IQR = 2.8) than that in remote consultations (median = 1, IQR = 1.8, $U = 0.5$; $p = 0.01$). For example, during face-to-face consultations, the clinician played a more active role using placeholder statements (e.g. 'Right, let's take a look [at your maternity folder]', 'Hang on, I'm just going to get the nurse to take a look at your rash'). These differences were unsurprising, and probably relate to the different physical environments, material artefacts and staff availability in the different types of consultation.

During face-to-face consultations in the Antenatal Diabetes clinic, patients did not use any talk that could be coded as giving direction, orientation or instruction. In contrast, in some virtual consultations, the patient did give direction or instruction. Much of this talk related to the patient's role in communicating their blood glucose readings to the clinician over Skype and writing the details in their maternity folder (e.g. referring to their own notes or getting a pen to write things down). However, this difference in 'direction' talk was not statistically significant ($U = 11$; $p = 0.18$).

Counselling

Although not statistically significant ($U = 108.0$; $p = 0.22$), the proportion of 'counselling talk' from clinicians was greater during face-to-face consultations (median = 5, IQR = 11.0) than during virtual consultations (median = 4, IQR = 5.5), across all clinical settings. The reasons for this difference varied depending on the clinical context. In the diabetes setting, the clinician often had direct access to the patient's notes on blood sugar readings and their insulin pumps, which may have facilitated a dialogue on managing their condition. During some of the Cancer Surgery clinics, the clinician conducted a physical examination of the patient if they reported any pain or symptoms, which may explain the higher levels of education and counselling talk in that setting.

Requests

In the Antenatal Diabetes setting, requests (asking for something) were significantly more frequent during face-to-face consultations (median = 13, IQR = 7.5) than during virtual ones (median = 6, IQR = 5.0, $U = 4.0$; $p = 0.02$). This difference was accounted for almost entirely by a higher rate of the clinician asking the patient to confirm their understanding in face-to-face consultations (median = 8, IQR = 3.0) than that in virtual consultations (median = 2, IQR = 4.5), which was found to be statistically significant ($U = 2.0$; $p = 0.01$). The majority of this talk was

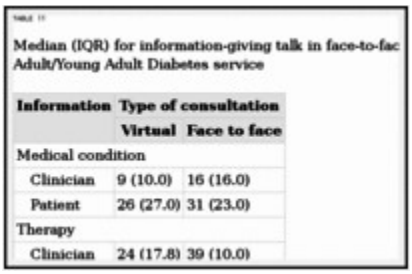
characterised by an inflected word or phrase (e.g. ‘Okay?) that invited the patient to indicate their understanding following an ‘information-giving’ or ‘counselling’ statement. Some face-to-face consultations involved the patient requesting a prescription (note that unless the patient and clinician were co-located, it would not be possible for the patient to obtain a printed and signed prescription, and electronic prescriptions were not in use in this setting).

Asking questions

The proportion of question-asking from clinicians in each of the clinics was similar for virtual and face-to-face consultations. However, in the Antenatal Diabetes setting, there were significant differences with regard to open versus closed medical questions. Closed questions included direct questions seeking specific information, whereby short responses are generally the only response options (e.g. ‘Are you just taking one tablet of the metformin?’). Open questions were characterised by their non-specificity and/or probing intent (e.g. ‘How was the scan?’). Most clinician questions in virtual consultations were open ended (median = 2, IQR = 3.8) as opposed to closed (median = 1, IQR = 3.0). In face-to-face consultations, the opposite was the case; the median number of open-ended questions was 2 (IQR = 1.3), and the median number of closed questions was 4 (IQR = 2.5). The higher occurrence of closed medical questions in virtual consultations was statistically significant ($U = 5.5$; $p = 0.04$). These differences in the occurrence of open and closed questions appeared to be largely attributable to the differences in the spatial and material aspects of consultations. In particular, the maternity folder could be shared and viewed by the clinicians during face-to-face appointments, whereas virtual consultations relied on the patient to verbally represent and summarise this information – often in response to questions from the clinician.

Sharing information

Tables 11–*13* show a breakdown of the information shared between patients and clinicians in virtual and face-to-face consultations across the three clinical settings. In the RIAS, medical information relates to statements of fact or opinion relating to the medical condition, symptoms, diagnosis, prognosis, past tests, test results and medical background of the patient. Therapy information relates to statements of fact or opinion regarding the ongoing or future (beginning with this visit) treatment plan, such as information relating to medications used or drug regimen. Lifestyle information relates to statements of fact or opinion relating to lifestyle (smoking, diet, sleep, alcohol and exercise habits), family and home situations, work or employment, health habits and self-care issues. Psychosocial information relates to concerns or problems such as stress, feelings and emotions, values and beliefs. Other information relates to talk that does not fall into the other categories, and includes neutral statements about the consultation (e.g. ‘today’s date is . . .’).

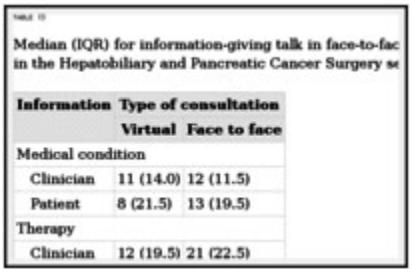


Median (IQR) for information-giving talk in face-to-fac
Adult/Young Adult Diabetes service

Information	Type of consultation	
	Virtual	Face to face
Medical condition		
Clinician	9 (10.0)	16 (16.0)
Patient	26 (27.0)	31 (23.0)
Therapy		
Clinician	24 (17.8)	39 (10.0)

TABLE 11

Median (IQR) for information-giving talk in face-to-face and remote consultations in the Adult/Young Adult Diabetes service

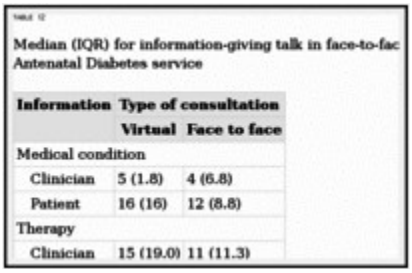


Median (IQR) for information-giving talk in face-to-fac
in the Hepatobiliary and Pancreatic Cancer Surgery se

Information	Type of consultation	
	Virtual	Face to face
Medical condition		
Clinician	11 (14.0)	12 (11.5)
Patient	8 (21.5)	13 (19.5)
Therapy		
Clinician	12 (19.5)	21 (22.5)

TABLE 13

Median (IQR) for information-giving talk in face-to-face and remote follow-up consultations in the Hepatobiliary and Pancreatic Cancer Surgery service



Median (IQR) for information-giving talk in face-to-fac
Antenatal Diabetes service

Information	Type of consultation	
	Virtual	Face to face
Medical condition		
Clinician	5 (1.8)	4 (6.8)
Patient	16 (16)	12 (8.8)
Therapy		
Clinician	15 (19.0)	11 (11.3)

TABLE 12

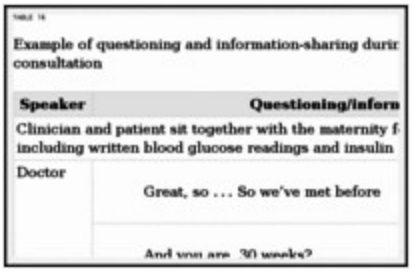
Median (IQR) for information-giving talk in face-to-face and remote consultations in the Antenatal Diabetes service

Although there was much information shared in virtual and face-to-face consultations, the kinds of information shared differed across clinics. In the Antenatal Diabetes service, there was a higher proportion of information-giving talk from the clinician in virtual consultations (88%) versus face-to-face consultations (65%) about therapeutic regime – perhaps because instructions and advice that could remain implicit in a face-to-face interaction were made explicit (or explained in more detail or repeated) in the virtual interaction. A far smaller proportion of clinician information-giving related to lifestyle (4% compared with 0.3%) or psychosocial issues (4% compared with 0.2%) in virtual consultations. This may have been a result of the clinician having direct access to the patient's medical information (blood glucose readings, insulin doses) and being able to direct questions to broader health-related issues in face-to-face consultations. In contrast, virtual consultations often required the verbal exchange of medical information, with the patient providing more information about their medical condition.

Patients took on a greater role in providing medical information during virtual consultations, mainly in order to convey the data they had collected to the clinician. The verbalisation of patient-generated data resulted in a greater level of affective talk on the part of the patient (e.g. optimism or concern about their blood glucose readings) in the virtual setting than in the face-to-face setting, although the differences did not reach statistical significance.

These differences in the types of talk across the different clinical settings were not statistically significant.

Examples of differences in information-sharing are given in *Tables 14* (for a face-to-face consultation) and *15* (for a virtual consultation). In the exchange in *Table 14*, the clinician views the patient's blood glucose results and insulin dosages (which are not verbalised by either party), as well as the result of an ultrasound scan. Her talk is mostly focused on commenting on these results and suggesting a change in treatment. In contrast, much of the talk in the virtual consultation (see *Table 15*) consists of the patient reading out both her blood glucose results and her (varying) insulin dosages from her own record and expressing concern about the former, while the clinician records the patient's readings on paper in the clinic before commenting and suggesting a change in treatment.

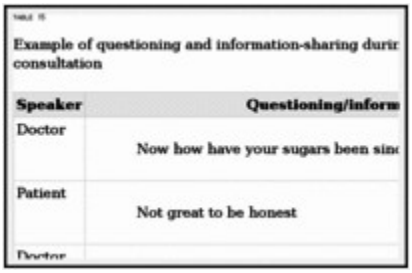


Example of questioning and information-sharing durir consultation

Speaker	Questioning/inform
Clinician and patient sit together with the maternity f including written blood glucose readings and insulin	
Doctor	Great, so … So we've met before
	And you are 30 weeks?

TABLE 14

Example of questioning and information-sharing during a face-to-face Antenatal Diabetes consultation



Example of questioning and information-sharing durir consultation

Speaker	Questioning/inform
Doctor	Now how have your sugars been sinc
Patient	Not great to be honest
Doctor	

TABLE 15

Example of questioning and information-sharing during a virtual Antenatal Diabetes consultation

Pauses and silence

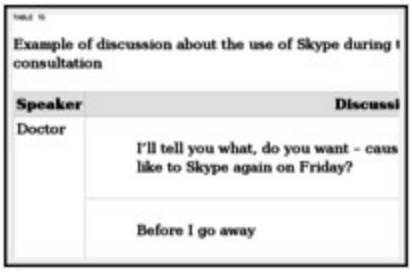
There were significantly more pauses (a silence of 2 seconds or more) during face-to-face consultations (median = 3, IQR = 4.5) than during virtual consultations (median = 0.0,

IQR = 1.0, $U = 58.5$; $p = 0.002$). The reasons for this were not immediately apparent. However, it is noteworthy that many of the pause events involved the clinician interacting with paper materials (e.g. reading and writing clinical notes) and interacting with the computer (e.g. accessing the EPR, checking appointment schedules). It is possible that the shared physical presence in face-to-face consultations allows such activities to be implicitly understood and made aware of (e.g. a patient may stop talking if the clinician turns to the computer). In virtual consultations, in contrast, it appears that the clinician may need to indicate their action through transition talk (e.g. 'I will just check your appointment time on the computer') or the patient may continue to talk while the clinician views the information on their screen.

Closing the consultation

The closing phase of virtual consultations was usually clearly defined and always marked the end of the appointment. In contrast, in face-to-face consultations, the clinician often directed the patient to the reception desk or asked them to wait for one of the nurses (e.g. to address additional clinical concerns). Hence, the end of a face-to-face appointment was often less clearly defined and 'closing' comments or social gestures were less appropriate.

Because the virtual Antenatal Diabetes service was still at a pilot stage during this research, the closing phase typically also included making a new appointment, as illustrated in *Table 16*. Such interactions (which contrasted with appointment-booking in the main diabetes clinic) illustrate how the remote service was not fully embedded in the 'business as usual' of the Antenatal Diabetes clinic.



Example of discussion about the use of Skype during t consultation

Speaker	Discussi
Doctor	I'll tell you what, do you want - caus like to Skype again on Friday?
	Before I go away

TABLE 16

Example of discussion about the use of Skype during the closing stages of a virtual consultation

Question 3: what kinds of technology-related talk occur in virtual consultations?

Technology-related talk was talk that related to patients' or clinicians' use of the virtual consultation technology and service. As with other categories (see *Table 2*), technology talk was extracted for analysis using the RIAS coding method, and clustered according to the three clusters:

1. socioemotional technology talk, related to the affective or emotional aspects of using the technology
2. task-focused talk, information exchange in relation to the technology
3. process-oriented talk, to support the use of the technology.

In the Antenatal Diabetes setting, technology-related talk constituted 4% of the overall talk in virtual consultations (seven utterances per consultation). Almost all of the technology talk in this setting occurred during the initial opening phase of each consultation and was process oriented rather than task oriented (i.e. it related to establishing connectivity, visibility and audibility, or resolution of any technical barriers to effective communication). In the Adult/Young Adult Diabetes setting, technology talk constituted, on average, only 1% of the overall talk in virtual consultations (five utterances) and also involved process talk around the start of the consultation. In this setting, the use of Skype for virtual consultations was more embedded within the day-to-day running of the service, meaning that the format was familiar to patients and clinicians. In the Hepatobiliary and Pancreatic Cancer Surgery setting, technology-related talk constituted, on average, 9% of a virtual consultation. Technology-related talk in this setting included process-oriented talk, as well as the socioemotional dimension of using the technology. The latter related to concerns around use, reassurance and optimism when it was working, and friendly jokes and laughter when using it, or when technical issues arose.

Most technology-related talk (92%) fell into the following categories:

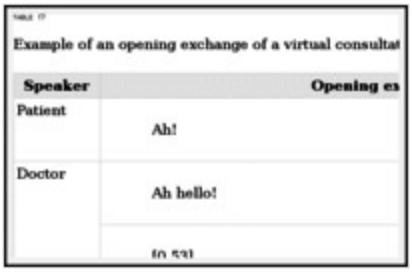
- *orientation* (40% of technology-related talk) – saying 'hi' or 'hello' to indicate connection, or telling the other party about technical issues (e.g. 'my camera is slipping a little bit')
- *reassurance/optimism* (22% of technology talk) – positive or reassuring statements in relation to the technology (e.g. 'I can see you perfectly', 'We're there')
- *seeking reassurance* (14%) – checking call quality or connectivity (e.g. 'Can you hear me?'; 'I hope you can see me okay')
- *laughs/jokes (8%)* in relation to the technology
- *transition (8%)* indicating an action or movement in relation to the technology, such as addressing audio/visual issues (e.g. 'hang on a minute', 'let me just turn on the camera so I can see you').

The remaining 8% of technology talk consisted of:

- *giving information* – a patient explaining to the clinician that Skype was not working on their laptop
- *agreement* – indicating understanding in relation to the technology (e.g. in response to a patient explaining a technical issue)
- *personal* – apologising if the technology is not working properly or a setting needs to be adjusted

- *bid for repetition* – if a person asks the speaker to repeat what they said because the audio cut out
- *concern* – statements expressing concern about the technology
- *checks understanding* – paraphrasing and checking what the other person said in relation to the technology.

Table 17 gives an example of technology-oriented process talk at the beginning of a virtual Antenatal Diabetes consultation and *Table 18* gives the opening exchange of a face-to-face consultation. The virtual interaction is very different from that in the face-to-face exchange. It illustrates that until a connection is established, neither clinician nor patient adopts the traditional role expected of them (both are focused on trying to get the technology to work, and neither is treating this as a formal part of the consultation). As soon as the connection is established, they adopt the usual social conventions of a doctor–patient consultation (at this point, but not before, the virtual exchange in *Table 17* begins to mirror the face-to-face consultation in *Table 18*).

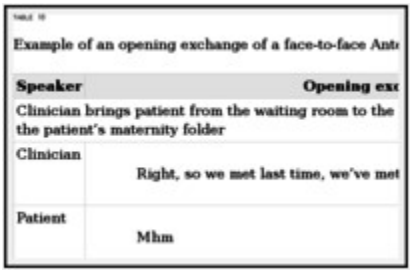


Example of an opening exchange of a virtual consultat

Speaker	Opening ex
Patient	Ah!
Doctor	Ah hello!
	(0.53)

TABLE 17

Example of an opening exchange of a virtual consultation for Antenatal Diabetes



Example of an opening exchange of a face-to-face Ant

Speaker	Opening ex
Clinician brings patient from the waiting room to the the patient's maternity folder	
Clinician	Right, so we met last time, we've met
Patient	Mhm

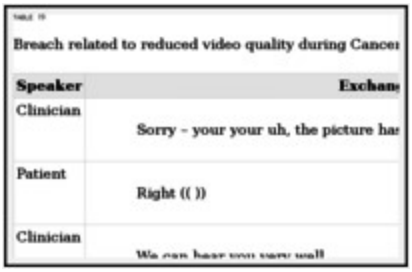
TABLE 18

Example of an opening exchange of a face-to-face Antenatal Diabetes consultation

Question 4: what kinds of breaches occur in virtual consultations and why?

Technical breaches included instances where the flow or continuation of the consultation was disrupted by technical or usability problems. As detailed above, the extent of technology talk varied across the different clinical settings. Over the 16 virtual consultations analysed using the RIAS, 12 breaches occurred in total, across eight cases (50%). The majority of these breaches (83%) occurred during the opening stage of the consultation.

Close to half (49%) of the technology-related talk that occurred during the virtual consultations was linked to technology breaches. Over half of this breach-related technology talk (51%) consisted of process talk – mainly orientation to inform and guide the actions of the other person in attempting to resolve the breach (31%); transition talk as a placeholder to inform the other person to wait while they attempted to resolve an issue (11%); and paraphrasing or bids for repetition, owing to impaired/loss of audio (4%). Socioemotional technology talk constituted 42% of the talk during the breaches. This included seeking reassurance (16%; e.g. 'Are you there?') and providing reassurance when managing the breach (e.g. 'Don't worry, I can still hear you') or in response to the breach being resolved (e.g. 'Ah, good, you're back now'). Although breaches were overlaid with some concern and the need to seek reassurance, such events also included social responses in the form of jokes and laughter (4%; *Table 19*).



Breach related to reduced video quality during Cancer

Speaker	Exchan
Clinician	Sorry – your your uh, the picture ha
Patient	Right (( ))
Clinician	We can hear you very well

TABLE 19

Breach related to reduced video quality during Cancer Surgery follow-up appointment

Some information-seeking and information-sharing was conducted during the breaches (7%). This mainly involved asking and telling the other person about the quality of the image/audio on their settings and their opinion about how to proceed (e.g. 'Do you think it would be better to stay talking on the phone and just use the video?').

The breaches in the consultations in our data set resulted from a number of different technical issues, with different approaches and strategies adopted to resolve them. These included the following:

- *Connectivity* (one instance), whereby the start of the consultation was disrupted, because the patient was unable to access the Skype application on their computer. This type of breach required both parties to make contact via an alternative means of communication (i.e. mobile phone or house/office telephone) to understand the problem (i.e. letting the other person know that they could not access Skype or had attempted to initiate contact) and devise and agree on a solution. In this case, the patient decided to use Skype on an alternative device (mobile phone), instead of their laptop.
    - In two further cases, patients experienced problems accessing Skype on their devices, but were able to resolve this issue before the consultation commenced (these were not classed as breaches in the analysis).
- *Establishing audio* (three instances), whereby there was disruption caused by problems in hearing the other person (once on the patient end, once on the clinician end and once undetermined). In one of these instances, the issue was quickly resolved through a change to the patient's audio settings (see *Table 17*) during the opening stage of the call. In the second instance, the sound could not be established, despite efforts by the clinician and

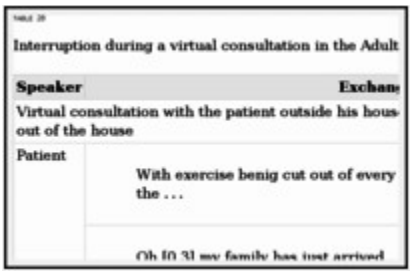
patient to identify the problem, and so it was decided (through discussion with the patient over the telephone) to conduct the consultation using a mobile phone on speaker phone (for audio), while continuing to run the video display on the computer. In the third, the audio was received at a low level on the patient end; hence, both patient and clinician decided to move closer to the computer (microphone) and speak more loudly throughout the consultation. One challenge to establishing audio in such circumstances was the difficulty in establishing the source of the problem (e.g. microphone, speakers, computers or device settings) and which end the problem was arising from. Navigating these issues in the absence of immediate verbal communication on both sides of the call presented significant challenges and required some other means of verbal communication (e.g. telephone, messaging, texting), some existing knowledge of the other person and knowledge of the technology and common issues related to its use.

- *Activating the video display* (one instance), whereby the start of the consultation was disrupted by the absence of the patient's video display. In contrast to the difficulties with audio, this issue was quickly resolved with the consultant informing the patient of the need to activate their video display.
- *Sound-quality issues* (two instances), whereby the consultation involved persistent sound-quality problems, causing pauses and bids for repetition during the consultation. In both cases, the interference was caused by a feedback sound loop from a voice dictation device (for clinical letters and reports) attached to the clinician's computer.
- *Temporary loss of audio/video* (two instances), whereby the conversation was affected by a temporary loss of audio or video quality as a result of poor internet connectivity. In one case, the listener identified the loss of sound and requested that the other person repeated what they had missed. In the second case, the call was disrupted on two separate occasions, as a result of loss of video, which distracted the users and prompted them to confirm that they could still hear each other.

Non-technical breaches in conversation (e.g. misunderstandings requiring one party to repeat themselves or seek clarification) were uncommon, and the RIAS analysis did not surface subtle examples of this. A further analysis using conversation analysis is under way, and will be reported separately.

Question 5: what kinds of interruptions occur in virtual consultations and what is the impact of these?

Interruptions included disruption to the flow or continuity of the consultation (*Table 20*). Across the 16 consultations, there were only two interruptions (in two separate remote consultations) related to the use of Skype within the home setting. In both settings, family members were visible and this led to a change of topic in conversation.



Interruption during a virtual consultation in the Adult

Speaker	Exchan
Virtual consultation with the patient outside his hous out of the house	
Patient	With exercise benig cut out of every the . . .
	Oh [0.3] my family has just arrived

TABLE 20

Interruption during a virtual consultation in the Adult Diabetes service

It is likely that such interruptions were relatively few in number because efforts were made by the clinicians and patients to find appropriate times and private spaces that would minimise the possibilities for interruption.

Events also occurred within clinics that could have potentially disrupted the flow of the consultation, including the telephone ringing (three instances) and staff knocking on the door (one instance). As clinicians did not actively respond to these interferences, they were not coded as an interruption to the consultation within our analysis.

Finally, interruptions in the flow were sometimes caused by the clinician's use of Skype on the same computer that they used to access the EPR at certain points of the consultation. This use of the computer for the dual purpose of remote consultation and information access presented possibilities for interruption. In two cases, the clinician used transition talk as a placeholder, as they attempted to return to the video view (e.g. 'Let's go back, sorry'). The flow of conversation appeared to quickly resume.

Summary

In summary, and based on a small subsample of consultations analysed in depth, virtual consultations appeared to be slightly shorter and slightly less clinician dominated than, but as equally clinician controlled as, face-to-face consultations. Apart from technology-related utterances, the kinds of talk were broadly similar in the two settings, but some subtle differences in certain categories of talk were evident.

Our analysis suggests that the main differences emerging between face-to-face and virtual consultations were a consequence of social, physical and material differences between the two settings (e.g. the absence of shared maternity notes had an impact on the direction of questioning and information-sharing in Antenatal Diabetes consultations). The physical setting of the clinic also provided social and physical arrangements that shaped interaction. Differences in patient–clinician interaction were rarely attributable to video-mediated interaction per se, but rather to contextual differences *beyond* the video link (e.g. whether or not a nurse was at hand, whether or not the clinician could see the patient's blood glucose readings). The higher proportion of pauses and mutual silence during face-to-face consultations is one area that requires further investigation. Such moments in a clinical encounter may play an important role in opening up opportunities for the patient to raise concerns.