

# What do we need to consider when planning, implementing and researching the use of alternatives to face-to-face consultations in primary healthcare?

Helen Atherton<sup>1</sup> and Sue Ziebland<sup>2</sup>

## Abstract

**Objectives:** Communications technologies are variably utilised in healthcare. Policymakers globally have espoused the potential benefits of alternatives to face-to-face consultations, but research is in its infancy. The aim of this essay is to provide thinking tools for policymakers, practitioners and researchers who are involved in planning, implementing and evaluating alternative forms of consultation in primary care.

**Methods:** We draw on preparations for a focussed ethnographic study being conducted in eight general practice settings in the UK, knowledge of the literature, qualitative social science and Cochrane reviews. In this essay we consider different types of patients, and also reflect on how the work, practice and professional identities of different members of staff in primary care might be affected.

**Results:** Elements of practice are inevitably lost when consultations are no longer face-to-face, and we know little about the impact on core aspects of the primary care relationship. Resistance to change is normal and concerns about the introduction of alternative methods of consultation are often expressed using proxy reasons; for example, concerns about patient safety. Any planning or research in the field of new technologies should be attuned to the potential for unintended consequences.

**Conclusions:** Implementation of alternatives to the face-to-face consultation is more likely to succeed if approached as co-designed initiatives that start with the least controversial and most promising changes for the practice. Researchers and evaluators should explore actual experiences of the different consultation types amongst patients and the primary care team rather than hypothetical perspectives.

## Keywords

Primary healthcare, remote consultation, communication, policy

Submission date: 26 May 2016; Acceptance date: 23 September 2016

## Background

Communications technologies are routinely used by the public in everyday life, and there is an expectation that this should extend to healthcare. Globally, the use of such technologies in healthcare is variable. In Denmark, the option to use email for consultations in general practice became mandatory in 2009 – a measure intended to raise the quality of services delivered to patients. In 2013 there were four million consultations conducted this way.<sup>1,2</sup> The US has well-

<sup>1</sup>Division of Health Sciences, Warwick Medical School, University of Warwick, Coventry, UK

<sup>2</sup>Nuffield Department of Primary Care Health Sciences, University of Oxford Radcliffe Observatory Quarter, Oxford, UK

### Corresponding author:

Helen Atherton, Division of Health Sciences, Warwick Medical School, University of Warwick, Coventry CV4 7AL, UK.

Email: [h.atherton@warwick.ac.uk](mailto:h.atherton@warwick.ac.uk)

Twitter: [@h\\_atherton](https://twitter.com/h_atherton)



established options, including patient portals for online access to clinicians and routine telephone consultations, which are offered by several of the large health maintenance organisations, under fee-for-service arrangements.<sup>3</sup> In Finland, emails between doctors and patients have been an unremarkable part of care for over a decade.<sup>4</sup> Mobile devices in parts of Africa have vastly increased access to the telephone, as well as the Internet; the potential impact is arguably more transformational than countries with pre-existing landline networks.<sup>5</sup> In the UK, there has already been much investment in the use of telephone and website services to provide patients with a 'non-emergency' point of entry to the healthcare system,<sup>6</sup> but this use has not extended to traditional care settings. Policymakers have suggested that alternatives to face-to-face consultations in the general practice setting could have a transformative (and positive) impact through alleviating staff workload and improving patient access, but their use is far from routine.<sup>7,8</sup>

Research on these alternative methods of consultation is in its infancy. The Cochrane reviews of the evidence about the use of email<sup>9</sup> and telephone<sup>10</sup> consultations found equivocal evidence from trials that are rarely high quality. In countries where alternative forms of consultation are on the agenda, primary care professionals have responded with both readiness and reluctance (but rather more of the latter). Opinion pieces and policy documents also reflect a mix of enthusiasm for innovation and resistance to change.<sup>11,12</sup> Patients, when they have been asked, are usually in favour of consultation options which appear more convenient and efficient.<sup>13</sup>

This essay arises from our preparations for a focussed ethnographic study, which we are currently conducting in eight general practice settings in the UK.<sup>14</sup> We draw on our knowledge of the literature and our experience in primary care research and practice, qualitative social science and Cochrane reviews, as well as formal and informal discussions with patients and general practitioners (GPs), and responses from conference audiences. We believe that this approach, which supplements our own contributions to Cochrane reviews of the evidence, is appropriate to the task in a rapidly moving field.

Recent years have seen a plethora of small and local pilot projects and commercial initiatives around specific systems,<sup>15,16</sup> which proliferate in an environment of patchy and inconclusive evidence. Because these models are being promoted as potentially cost-effective solutions in primary healthcare, their growth will likely continue unless major safety and economic consequences become apparent. We suggest that some cool reflection is needed about what should be considered when planning, implementing and researching alternatives to the face-to-face consultation. Our aim in this

essay is not to synthesise or review the published evidence, but to consider, more widely, what might be the effects of alternative forms of consultation at the level of the patient, the organisation and the professions, and the implications for the consultation, the practice environment and broader health system. We discuss what might be gained, and what lost, through using alternative forms of consultation. We consider different types of patients, for example people whose circumstances that make it hard to visit the practice, and also reflect on how the work, practice and professional identities of different members of staff in primary care might be affected. We aim to provide some thinking tools for policymakers, practitioners and researchers who are involved in planning, implementing and evaluating alternative forms of consultation in primary care.

In structuring our essay, we have drawn on the sociological framework of healthcare work and organisation for information and communications technology (ICT) initiatives as outlined by Halford et al.<sup>17</sup> Their theoretical approach views that the introduction of new ICT applications threatens to disrupt healthcare work and organisation by disrupting social orders mediated by inter-relations of power, knowledge and identity. The analytical framework positions ICT initiatives within orderings of healthcare work and organisation, with ICT applications posing three potential disruptions to the organisational, professional and spatial dimensions of healthcare work and organisation. We chose this framework because it helps us to understand, at a general level, how ICT initiatives disrupt the prevailing order of healthcare.

We use these dimensions to structure our discussion, with the acknowledgement that these are inter-related and ongoing processes that are shaped by healthcare work and organisation, and are not occurring independently.

Our starting point in compiling this essay was the recognition that any new technology can be highly disruptive to practice, even if it ultimately benefits both the service and the practice population. We also recognise that resistance to change is normal,<sup>18</sup> especially if staff are under pressure or feel that the innovation may interfere with the most cherished aspects of their role.

## Organisational disruptions and dynamics

New initiatives disrupt existing organisational practices. This is generally assumed, by those initiating them, to occur in a positive fashion, bringing benefit.<sup>17</sup> We suggest exploring this notion in relation to patient awareness, organisation of alternatives within the healthcare setting, ensuring safety when using alternatives in the healthcare setting and organisation of space in the healthcare setting (Table 1).

**Table 1.** What to consider when planning, implementing and researching alternatives to face-to-face consultations.

Key questions	
<i>Organisational disruptions and dynamics</i>	
Patient awareness	How could patients find out what methods of consultation are offered by their doctor?
Organisation of alternatives within the healthcare setting	<p>How will alternatives be scheduled into existing practice?</p> <p>What impact will alternatives have on reception and administrative staff work patterns?</p> <p>What are the agreed rules of engagement for use of alternatives?</p> <p>What contingency is in place to ensure that communication by asynchronous alternatives is responded to, and in a timely fashion?</p> <p>How will the expectations of all parties be managed?</p> <p>How can consultations be appropriately administered to avoid duplication of effort?</p> <p>How will alternative forms of consultation be documented in the medical record, especially when consulting remotely from the practice?</p> <p>Is reimbursement for alternative consultations appropriate? What are the arrangements for reimbursement?</p>
Ensuring safety when using alternatives in the healthcare setting	<p>What are the potential patient safety issues associated with using alternatives?</p> <p>How are (or might) these be mitigated?</p> <p>Are there risks for patient privacy and confidentiality?</p>
Organisation of space in the healthcare setting	What are the contingency arrangements for technology failure?
<i>Professional disruptions and dynamics</i>	
Interface between technology and individual practice	What did the designers intend it to do — and (more important) how is it used in practice?
Proximity of professional to patient	<p>Does it allow eye to eye contact? Is it real time or asynchronous?</p> <p>What is lost in comparison with the co-present consultation?</p> <p>What is the effect on valued aspects of primary care such as the relationship and continuity of care?</p> <p>What is the alternative appropriate for? Is the alternative offering a replacement for the face-to-face consultation or is it complementary?</p> <p>Is there a risk of misunderstanding due to the change in medium and can this be mitigated for?</p> <p>Will alternatives change how patients communicate?</p>
Primary care teams	<p>How are the roles of different team members affected by use of alternatives?</p> <p>Are there implications for staffing in the practice?</p>
Professional indemnity	How is medico-legal protection in relation to non-face-to-face consultations organised and understood in the practice setting?
Healthcare professional attitudes	What are the views and concerns of different members of the team about alternatives to the face-to-face consultation?
Healthcare professional skills	<p>What skills are needed? Is training and support available?</p> <p>Will patients require training, or guidance in using alternatives?</p>
Broader changes to professional practice	<p>Will the introduction of alternatives allow for flexible working?</p> <p>If so, might this impact on primary care staffing: recruitment and retention?</p> <p>Are there cost implications?</p>
<i>Spatial disruption and dynamics</i>	
The nature of the communication medium	<p>Who was involved in setting up the system and whose work was considered?</p> <p>Is the rationale for introducing alternatives clear and understandable to all staff members?</p> <p>What impact does it have on all of the different members of the team?</p> <p>Whose core values and interest are served?</p> <p>How is resistance enacted, and by whom?</p>

(continued)

Table 1. Continued.

Key questions	
Patient interface with alternatives to the face-to-face consultation	<p>How will patient experiences of using alternatives be collected and recorded?</p> <p>Are there types of consultation that are preferred face-to-face?</p> <p>What about patients from groups who are often assumed to be disadvantaged in relation to alternative methods (older, disabled, less educated, language difficulties)?</p> <p>How might patients use the opportunity to share digital files with their doctors?</p>
Unintended consequences	<p>Are there consequences (either positive or negative) for other elements of the practice, or other aspects of care provision? Consequences for other parts of the health system (use of emergency helplines, hospital emergency departments, etc.)?</p> <p>Do (how do) staff and patients modify new forms of consultation to better meet their needs?</p> <p>How else might the planner, implementer or researcher identify unintended consequences?</p>

### Patient awareness

In settings where the availability of alternative forms of consultation is a matter for individual practices, rather than required by policy directives, then it is worth asking how patients find out what is available to them at their practice. In a survey of patients' reasons for not consulting their doctor by email, the lack of awareness of the possibility of an e-consultation was one of the main reasons for non-use.<sup>19</sup> We should observe whether there is a poster in the waiting room. Is there a reminder at the reception desk? Could patients find this information in the practice leaflet, or on the practice website? Indeed, does the practice have a website? Is there a patient portal inviting email enquiries? Does the receptionist booking the appointment suggest an alternative form of consultation to patients (and if so, which patients)? Or do staff select 'sensible' patients' for email consultation? Primary care professionals have described selectively offering alternatives to patients they feel are able to use them appropriately.<sup>20,21</sup> The answers to these questions will clearly affect uptake and the attitudes both of patients and members of the primary care team.

### Organisation of alternatives within the healthcare setting

Several of the misgivings that have been raised about alternative consultations relate to the organisation and administration of the practice rather than the consultation itself. Common concerns include: What will happen if a part-time member of staff doesn't pick up an urgent email? Will alternative methods introduce inefficiencies for the practice?<sup>13</sup> Staff sometimes express concerns about whether patients will exercise their options responsibly, fearing that the relative ease of sending an email (or a stream of emails) may mean that some patients will over-consult or misrepresent

their symptoms.<sup>22,23</sup> While evidence is limited, in settings where email consultations have been introduced they have not, as yet, opened the floodgates for patient demand.<sup>24</sup> Even in practices and health systems where patients have had the right to email their family doctors for some time, these alternatives are not widely used.<sup>25,26</sup> In Denmark, where email consultations are a standard part of primary care, some doctors admit to managing their patients expectations by deliberately delaying their responses to non-urgent emails.<sup>27</sup>

Potential inefficiencies include duplicated consultations if patients consult remotely and then attend the practice or need a home visit.<sup>28–30</sup> A study of telephone triage in general practice found that where telephone triage led to a face-to-face consultation, the duration of this subsequent face-to-face consultation was no shorter despite a clinician speaking with the patient during the telephone encounter.<sup>31</sup>

Primary care is set up to deliver the face-to-face consultation. As yet, there is little evidence about how best to time, conduct and record other forms of consultation.<sup>22,32,33</sup> These uncertainties make changes to service delivery difficult.<sup>9,34</sup> Alternatives to face-to-face consultations could be managed in scheduled daily or weekly sessions or (systems permitting) in between other clinical appointments, in transit, or from home. An email, and its attachments, may be transferred into the patient record with greater efficiency than notes from a consultation, but if the primary care professional is replying to emails away from their office it is easy to envisage problems occurring in record-keeping.

Arrangements for recognising and reimbursing some of these alternatives remains something of a work in progress.<sup>35,36</sup> For example, Danish GPs have reported a lack of consensus about when emails are more akin to 'social exchanges' of pleasantries than consultations.<sup>37</sup> In the US, problems have arisen where reimbursement for Medicare patients is at the discretion of individual

insurers, with many patients not reimbursed for alternative types of communication with their healthcare provider.<sup>38</sup>

Different alternatives also differ in their impact on practice organisation. The face-to-face consultation is usually booked via reception staff. This is also the case for most telephone consultations.

Email can allow patients to bypass the gatekeeping role of the reception staff and obtain direct contact with the primary care professional, or whoever is allocated the task of replying to the email.<sup>21,39</sup> This prospect is sometimes viewed as unacceptably disruptive by physicians,<sup>40</sup> although, as we have discussed above, patients tend to like the improved access.

### *Ensuring safety when using alternatives in the healthcare setting*

Patient safety is crucial in any form of consultation, but alternatives present an unknown in terms of what these issues might be. Despite patient safety being cited as a reason to be wary of introducing alternatives,<sup>41</sup> there is very little documentation of what these might involve. Patient privacy and confidentiality are described as important, but reports of privacy and confidentiality breaches are few and collection of these data uncommon. The Cochrane review of trials relating to email for consultation found that the trials did not report any harms; but this is not, of course, the same as stating with confidence that no harms occurred.<sup>9</sup> There is much work to be done in identifying potential patient safety issues and mitigating the risk associated with these.

As well as considering risk in medico-legal terms, consideration must be made for the medico-legal support available to primary care teams. Medical indemnity fees are already a significant expense for primary care practices.<sup>42</sup> Doctors seeking advice from medico-legal organisations are likely to receive conflicting advice and, in some cases, following their enquiry, may see an increase in their annual fees. This situation has implications for the introduction of alternatives to the face-to-face consultation and some teams may conclude that additional costs will likely outweigh any efficiency savings.

### *Organisation of space in the healthcare setting*

To benefit from video conferencing, practices may need to allocate a well-lit, private area for the staff to use and reliable connections so that screens do not freeze mid-consultation.<sup>40,43</sup> The same, of course, applies to the systems that the patients are using.<sup>44</sup> Reliable contingency arrangement may be needed in case of technological failure. The potential for 'freezing' or image

breakdown during a video consultation may have clinical consequences – for example, it can be particularly disturbing for people with mental illness.<sup>43</sup>

## **Professional disruptions and dynamics**

Professional identities and roles are important. New initiatives have the potential to disrupt professional knowledge and practice, and inter-professional relations.<sup>17</sup> We suggest exploring this notion in relation to the interface between technology and individual practice, proximity of professional to patient, primary care teams, professional indemnity, healthcare professional attitudes, healthcare professional skills and broader changes to professional practice (Table 1).

### *Interface between technology and individual practice*

As the sociology of science and technology has demonstrated repeatedly, what a technology *is* cannot be determined by its design but by how it is used.<sup>45</sup> The potential of a new technology is 'not pre-given but is shaped in practice';<sup>46</sup> In studying these alternative consultation technologies we need to place at the forefront of the analytic agenda how the technology is used (and resisted).<sup>47</sup> This will often require direct observations of the work practices, since the actors involved may not be aware – or may find it difficult to report – when and how their interactions are shaped by the technology.

The complex relationship between the characteristics of the technology itself and the way that people use, avoid and adapt it in everyday practice also means that it may be hard to wrestle transferable outcomes from the field. It may be difficult for users to separate what are truly technological issues concerning hardware and software, and what arises as a result of introducing new practices. But a good start will be to explore the practice around the technology rather than assuming that its effects are constant (for here lies a sure route to non-transferable interventions).

### *Proximity of professional to patient*

The common feature of all alternatives to the face-to-face consultation is, of course, that they are not face-to-face; therefore, it is inevitable that they will be compared with this 'ideal' form of consultation.<sup>48</sup> Physical co-presence within the consultation has been a taken-for-granted characteristic<sup>49</sup> and is a central component of the patient–doctor relationship within primary care.<sup>50,51</sup>

The healthcare professional's identity is also tied up in the face-to-face consultation, whether conducted in



their own office or in the patient's home. This is where professionals demonstrate their clinical knowledge and skills and make decisions about the meaning of the patient's sensations and symptoms.<sup>52</sup> The consultation is also where the doctor performs care and (ideally) develops the mutually trusting relationship and continuity of care that underpins a highly valued aspect of primary care.<sup>53</sup> A different medium inevitably changes some aspects of the performance of the consultation; these elements are either lost or may need to be expressed in a different way or performed at a different time, for core elements of the doctor–patient relationship to be maintained.<sup>54,55</sup>

Primary care consultations typically include history taking, physical examination and investigation.<sup>51,56,57</sup> There is particular uncertainty around the 'rules of engagement' for email and video consultations.<sup>21,27,58</sup> The proximity with the patient that is afforded in the traditional face-to-face consultation permits diagnostic cues such as smelling the patients skin and breath, noting how they walk into the room and using casual contact, such as shaking hands, to assess skin temperature and tone.<sup>59,60</sup> The professional may lose some of their ability to check the patients understanding, which is often conveyed via non-verbal communication.<sup>61,62</sup> As yet, there is little research indicating whether misunderstandings are increased or diminished with alternative forms of consultation.

Doctors also describe 'door handle' issues, whereby patients divulge new information just as they are about to leave the consultation. Conversely, remote (and especially asynchronous) exchanges may offer other opportunities to reflect on the consultation and seek second opinions, which could improve care (and avoid loss of professional face).

Some primary care consultations do not require the use of honed clinical skills; routine clinical issues may be more efficiently dealt with without direct contact. Blumenthal, writing in 2010 in the context of US healthcare, anticipated a future primary care workplace with a dramatic change to workflow through the online management of administrative issues such as prescription renewals, referrals, appointments, third-party authorisations and paperwork.<sup>63</sup> He also envisaged that before the consultation, patients would be routinely asked to complete an online questionnaire (about the problem, symptoms, recent changes). A self-confessed optimist about the impact of the Internet on health and care, he anticipated that patients who would want to be full partners in their care would have access to their entire health records. Thus, 'Everything providers know about patients, and everything they do with and for them, will be mediated by software. The computer will be as omnipresent and important as the stethoscope.' p14.

## Primary care teams

Very little is known about the implementation of alternative forms of consultation in primary care, but there is a wealth of literature which supports the need for new systems to take account of the values and practices of the team.<sup>64–66</sup> Implementation of new approaches to the primary care consultation is particularly unlikely to be successful if the technology does not fit into the work patterns of front-line members of the practice team.<sup>67</sup> The impact of alternative forms of consultation on collaborative working, division of labour, continuity and multidisciplinary care have received minimal attention to date.

At a minimum, primary care teams include doctors, nurses, allied health professionals, practice managers, administrators and reception staff. New technologies are unlikely to be accepted by staff who doubt that the technology will help them to fulfil their core roles, which evidently differ. In the literature, doctors' views feature most prominently and the perspectives of administrative staff and reception staff are very rarely considered. This may seem surprising given the centrality of the administrative staff and receptionists in administering and allocating appointments. As the usual point of contact for patients seeking appointments with clinical staff, the receptionist is key to whether patients are guided towards any alternative method of consulting.

How the alternative is introduced and implemented in the practice will affect how the change is managed, and resisted, and with what consequences. Clinical staff in particular may be reluctant to make adjustments which they see as driven by non-clinical, political, external, administrative or financial pressures. Studies to date have rarely indicated whether the introduction of the alternative was agreed across the practice team, or introduced by a single member of the team. Given the complexity of the setting and the multiple potential effects of the alternative approaches for different parties, we suggest that these matters should be considered key in future work.

## Professional indemnity

Related to the lack of guidance or consensus on best practice, patient safety and the risk of litigation are often raised when alternative forms of consultation – or, indeed, almost any changes to practice – are proposed.<sup>20,68</sup> This could be understood as a proxy reason, given that highlighting concerns about patients' safety is undoubtedly a more 'acceptable' form of resistance than voicing concerns about threats to professional identity and power. Yet, there is also some evidence that clinicians' safety concerns are translating into more cautious prescribing behaviour; for example,

primary care doctors shown to be more likely to prescribe antibiotics during an e-visit than when they consult face-to-face.<sup>69</sup> This may reflect uncertainty around the medico-legal consequences of this type of prescribing. When we are trying to understand how alternatives are working, we need to be alert to how safety netting procedures are enacted.

### Healthcare professional attitudes

When healthcare professionals are asked about their views on using alternatives to the face-to-face consultation, concerns tend to focus on whether their clinical duty to provide safe and effective care might be compromised.<sup>70,71</sup> Much of this concern relates to the potential impact of these additional consultation methods on their workload. Fears expressed include increases in consultation volume<sup>72,73</sup> and increased administrative load.<sup>74</sup>

Those with experience of successfully using alternatives in their own practice raise similar issues, still feeling uncertain about the long-term effects on their workload and, consequently, their patients.<sup>21</sup> Research suggests that any new technology needs to be seen to enhance what the professional sees as their core role,<sup>65</sup> otherwise it is unlikely to be accepted into practice.<sup>75,76</sup>

There have been far fewer studies collecting the views and experience of practice nurses on alternative consultation methods, but there is evidence that nurses feel their role requires proximity to the patient.<sup>55,77,78</sup> Intriguingly, Tjora, in a Norwegian study of nurses working in emergency medicine, found that they were more assertive and gave more advice when consulting remotely rather than face-to-face.<sup>79</sup> In a study of a telehealth self-care support system for people with chronic health problems, the nurses who were providing the service positioned their work as 'proper nursing' while primary care nurses whose practices were using the telecare system suggested that the calls with patients were 'just chat' and doubted that real nursing could be delivered via the telephone.<sup>80</sup> This recalls the work of the Dutch social scientist Jeanette Pols, who has described a 'professional fear' among nurses that

the use of telecare systems will make it more difficult for nurses to act competently and responsibly when looking after patients, particularly because care is at a distance and the nurse is not physically present. Although videoconferencing often has a better press, monitoring devices not involving eye to eye contact are regarded with suspicion. The horror images seem to be *negligence* and *coldness*: the patient is 'on telecare', but gets worse, without anybody having noticed it.<sup>81</sup> p375

Pols has challenged the contrasting association of 'technology' with coldness, distance and efficiency and 'care' as warm, proximal and emotionally involved, pointing out in 'Care at a distance'<sup>82</sup> that this is a false dichotomy. Her ethnographic work with elderly patients with heart failure, and the nurses and other staff involved in a home video telecare system, found that the nurses were able to perform 'care even closer' rather than 'care at a distance' through using the technology.

### Healthcare professional skills

It is important to consider whether the technology is familiar and easy for both parties to use or whether it requires new skills. Varsi et al.<sup>83</sup> recommend that patients should be shown how to use a system at a point when it is relevant to them, rather than as part of a general induction to their doctor's practice. If the information does not come at the right time the patient may not remember the system or (likely in a fast moving field) the system may have changed by the time they come to use it. Some healthcare professionals worry that their lack of confidence with technology may be exposed, and that such exposure might undermine their authority.<sup>84,85</sup> In a study of breastfeeding support via video consultation, lactation consultants were concerned about technical issues such as the quality of images, yet patients were very satisfied with the remote consultation. The lactation consultants were not confident about undertaking clinical assessments via video – a need which the authors concluded could be addressed by specific training in using the medium.<sup>44</sup> While the balance of power within the consultation may change if the primary care professional's skills comes under patient scrutiny,<sup>86</sup> this is not necessarily damaging and could even be a helpful shift in the balance of the longer-term relationship.

Another consideration is whether the method allows the parties involved in the consultation to add web links and attachments. Does it leave a record of the interaction that can be accessed by the participants and others? What the technology can and cannot do, how difficult it is for the participants to use, and what support is needed to help the parties to become competent in its use, are all important considerations.

### Broader changes to professional practice

Alternative forms of consultation offer a change to the location and time of work for healthcare professionals; remote methods of consulting allow for flexible working, for instance, drawing retired clinicians back into the workforce by allowing them to consult remotely, thus also addressing workforce shortages.<sup>87</sup> There is

also scope for part-time staff to consult remotely,<sup>88,89</sup> adding flexibility to their work. For example, in Pakistan 70% of medical students are female but only 23% of practising doctors are female. A pilot study in Sultanabad, Pakistan (the DoctHERS project) has sought to address this by allowing women doctors who have left the workplace ‘due to marriage or children’ to consult patients via Skype from home, serving people who would not otherwise have access to quality healthcare.<sup>90</sup>

Globally, primary care professionals are under pressure in the workplace. Alternative methods of consultation have been promoted in some settings as a solution to increased demands from an aging population, managing long-term conditions.<sup>91</sup> The emphasis has often been on (cost-) efficiency, which professionals may see as conflicting with their professional identity and ability to deliver high-quality patient care.<sup>65</sup>

Worries about using a form of consultation that is not ‘tried and tested’ tie in with concerns about the long-term sustainability of primary care and how it is funded and staffed. There has been a steady move towards involving non-medical staff – for example, physician assistants – in delivering care.<sup>92,93</sup> Now widely used in the US, physician assistants are mooted as a way of addressing the primary care workforce crisis in Europe too. There is the possibility that this could focus around the use of alternative forms of consultation. Recently, a UK primary care practice has advertised for a physician assistant whose role will be to conduct consultations via alternative methods only.<sup>94,95</sup>

## Spatial disruption and dynamics

Spatialisations of work and organisation relate to identity and power and how they change when a new initiative is introduced. This is often seen as being a technical or economic issue, when occupying space is more complex than this, comprising the representation, meaning and practice in the work and organisation.<sup>17</sup> We suggest exploring this notion in relation to the nature of the communication medium, patient interface with alternatives to the face-to-face consultation and unintended consequences (Table 1).

## The nature of the communication medium

There are already many different technologies that patients could use to consult their doctor without meeting face-to-face – for example, telephone, email, Short Message Service (SMS) and video communication. While specific platforms are likely to be superseded in a fast changing field, we can differentiate according to whether the method provides (moving) images, audio or written content, and whether the exchange is in real

time or asynchronous. Asynchronicity allows the healthcare professional to draw upon external resources or check evidence, perhaps providing sources of information for the patient.<sup>13,83</sup> For patients, it allows them time to construct an enquiry, perhaps with help from family or friends, and to send follow-up questions that occur after a consultation. Methods that allow video connection give participants the opportunity to view a symptom (such as a rash) and also, potentially, a view of the patient’s home setting. Video may also help establish a relationship, and enable the participants to monitor non-verbal cues and check understanding.<sup>96</sup>

## Patient interface with alternatives to the face-to-face consultation

Where patients have been offered alternative methods of consultation, they usually report liking them.<sup>97,98</sup> Email and telephone consultations remove the need to attend the GP or nurses’ professional space, which tends to be viewed as a benefit by patients.<sup>13,39,69</sup> Other reported benefits include the convenience of being able to consult whilst at work,<sup>99</sup> to choose when and how to consult and the perceived advantage of avoiding the doctor’s receptionist.<sup>27,77</sup> The ability to communicate with one’s doctor via email means that the patient can compose a message when something is bothering them, which may be outside of office hours. The patient (and their family) may like to exchange information and attachments relevant to health and care decisions and forward these to their health professionals. Parents can photograph, record and attach digital files with images of a child’s rash, or recordings of an infrequent cough or breathing difficulty.<sup>27,84</sup> For patients preparing for a visit to hospital, or recovering at home afterwards, these methods can provide a way to keep in touch without necessitating a visit.<sup>55</sup>

In 2002, Muir Gray’s ‘The Resourceful Patient’<sup>100</sup> recognised the potential value to patients of e-consultations for which they could prepare with ‘pre-consultation prep’ to be better able to participate in decisions. He acknowledges that

not all patients will wish to avail themselves of the responsibilities and resources...however the fundamental contract between patient and clinician in the 21<sup>st</sup> century should start with the assumption that the patient is competent and responsible, providing they are given the resources to exercise that responsibility. (p.112)

Email exchanges can provide a record and, perhaps, a clearer explanation and understanding than may be absorbed face-to-face.<sup>55</sup> This may be particularly



advantageous to those who are less articulate or confident in person, those who wish to discuss their consultation with others and those who need help with translation.<sup>22</sup> Some patients may be more willing to disclose intimate or sensitive information via an email than in person or over the phone – especially if they are at work or in a public place.<sup>27</sup> For others, the reverse will be true, not least because of concerns about confidentiality in emails.

Health professionals raise concerns that older patients, disabled patients, people without literacy skills and those patients who are less educated<sup>3,26</sup> may be disadvantaged through alternative forms of consultation.<sup>70</sup> Interestingly, there is some evidence that, for those who have Internet access, patients who are disabled, elderly, less confident or living at some distance from the practice are often amongst those who are particularly keen to use email consultations.<sup>101</sup>

While there is a lot of speculation about the potential benefits and disadvantages for patients, and particular subgroups of patients, much of it has been written from the healthcare professional perspective and credible empirical evidence from patients is very limited. The perspectives and experiences of patients (and especially those from groups who are assumed to be disadvantaged through the introduction of alternative methods of consulting) clearly needs further attention when designing implementing and evaluating systems.

### Unintended consequences

Any planning or research in the field of new technologies should be attuned to the potential for unintended consequences. There are numerous examples of technologies that have been tinkered with and adapted in the field,<sup>65</sup> some to the extent that their initial purpose is barely recognisable. Changes in one element of care provision can have effects on other elements of care, and on the role of other staff. An example is Winthereik and Langstrup's (2010) study in Denmark of patient and professional behaviours in response to a new portal for pregnant women.<sup>102</sup> The portal was introduced to help women with uncomplicated pregnancies to self-manage, thus (it was anticipated) freeing up resources for more complicated cases. They found that the (minority) of women who engaged with the portal enacted their active and responsible involvement at the clinic rather than at home. The use of the portal, therefore, provided both more and less than was anticipated: it reconfigured relations in a way that is likely to alter the meaning of care, but not in a manner that was likely to free up resources. The healthcare practitioners, who were supposed to be using the portal to maintain a

complete and shared electronic record, were instead printing a paper record and adding their own handwritten notes. The healthcare professionals ended up doing more work than before.

### Discussion

Our intention in this essay has been to consider how alternatives to face-to-face consultation in primary care might be developed and understood, bearing in mind the needs of those who plan, implement and research these alternatives. Some concerns (e.g. confidentiality, safety and litigation) have been frequently raised in the literature,<sup>21,103</sup> while others (e.g. how changes to the options open to patients may affect the work practices of doctors' receptionists and practice managers) have received very little consideration in the literature to date. Aware of these gaps, we have sought to reach beyond the confines of a literature synthesis and instead draw on our preparation for an ethnographic study in primary care, using a structure focused on how ICT initiatives sit within healthcare. Where there is a relevant literature, we have referenced it, but we also offer informed speculation (and a few tangents) which we hope will help policymakers, primary care teams and researchers to consider the potential consequences of changes to the consultation. We have made the assumption that the 'traditional' method of consultation is face-to-face, but acknowledge that this is based on the status quo. As far back as the 1700s, alternatives to the face-to-face consultation were in use; Edinburgh physician Dr William Cullen famously conducted consultations with his patients via letter.<sup>104</sup>

We have described resistance shown by healthcare professionals to the introduction of alternative methods of consultation. This type of resistance is normal and objections are often expressed via proxy reasons, for example concerns about patient safety. However, as we have discussed, elements of practice are inevitably lost when consultations are no longer face-to-face and we know little about the impact on core aspects of the primary care relationship. The 'real' reasons for staff enthusiasm or resistance are always likely to be elusive, but those who wish to implement these changes are more likely to succeed if they work with the practice team and the patient population in co-designed initiatives that start with the least controversial and most promising changes for the particular practice. Researchers and evaluators would be well advised to ask different groups of patients, as well as different members of the primary care team, about their actual experiences of the different consultation formats rather than add to the largely hypothetical responses that dominate the current literature.

In this essay we take a pragmatic approach as to what we need to consider when planning, implementing and researching the use of alternatives to the face-to-face consultations in primary care. We hope in applying these that the consequences, positive and negative, of implementing alternatives to face-to-face consultation in primary care can be better understood, to the benefit of patients, primary care teams and the health system.

**Acknowledgements:** We would like to thank our colleagues on the Alt-con project, Professor Chris Salisbury, Professor Brian McKinstry, Professor John Campbell and Dr Andy Gibson, for their comments on the manuscript. We would also like to thank Professor Trish Greenhalgh, Dr Hege Andreassen and Mr Bob Gann for reading and commenting on this manuscript.

**Contributorship:** Both HA and SZ wrote and edited this essay together.

**Declaration of Conflicting Interests:** The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article..

**Ethical approval:** Not applicable.

**Funding:** The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by the National Institute for Health Research (NIHR) Health Services and Delivery Research programme (13/59/08). The views and opinions expressed therein are those of the authors and do not necessarily reflect those of the HS&DR Programme, NIHR, NHS or the Department of Health. Helen Atherton was funded by a NIHR School for Primary Care Research (SPCR) Fellowship until 31 August 2015.

**Guarantor:** HA.

**Peer review:** Stephen Barnett, University of Wollongong and one other individual who has chosen to remain anonymous reviewed this manuscript.

## References

1. Danish Government. Den digitale vej til fremtidens velfærd, <https://horsensbibliotek.dk/om-bibliotekerne/projekter/den-digitale-vej-til-fremtidens-velfaerd> (2011, accessed 24 March 2016).
2. Danish Medical Association. Aktivitet og økonomi i almen praksis i dagtid og vagttid 2003 til 2013, [http://www.laeger.dk/portal/pls/portal/!PORTAL.wwpob\\_page.show?\\_docname=10539072.PDF](http://www.laeger.dk/portal/pls/portal/!PORTAL.wwpob_page.show?_docname=10539072.PDF) (2014, accessed 24 March 2016).
3. Pearl R. Kaiser Permanente Northern California: current experiences with Internet, mobile, and video technologies. *Health Aff* 2014; 33(2): 251–257.
4. Castren J, Niemi M and Virjo I. Use of email for patient communication in student health care: a cross-sectional study. *BMC Med Inform Decis Mak* 2005; 5: 2.
5. Bloch A. *The potential of mobile technologies to positively impact access to essential medicines in low and medium income countries*. Washington, DC: mHealth Alliance, 2010.
6. Knowles E, O’Cathain A, Turner J, et al. Awareness and use of a new urgent care telephone service, NHS 111: cross-sectional population survey. *J Health Serv Res Policy* 2014; 19(4): 224–230.
7. Department of Health. The power of information: putting all of us in control of the health and care information we need, <http://informationstrategy.dh.gov.uk/> (2012, accessed 24 March 2016).
8. Brant H, Atherton H, Ziebland S, et al. The use of alternatives to face to face consultations: a GP survey. *Br J Gen Pract* 66(648), <http://dx.doi.org/10.3399/bjgp16X685597> (2016).
9. Atherton H, Sawmynaden P, Sheikh A, et al. Email for clinical communication between patients/care-givers and healthcare professionals. *Cochrane Database Syst Rev* 2012(11), <http://onlinelibrary.wiley.com/store/10.1002/14651858.CD007978.pub2/asset/CD007978.pdf?v=1&t=i5i8fr43&s=afcd28210950d3898a3ddbddd900cc7dbc9f2a784> (2012, accessed 24 March 2016).
10. Bunn F, Byrne G and Kendall S. Telephone consultation and triage: effects on health care use and patient satisfaction. Telephone consultation and triage: effects on health care use and patient satisfaction. *Cochrane Database Syst Rev* 2004(3), <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD004180.pub2/abstract;jsessionid=4DAC66F0E7E47B875646D626D402CF5E.f03t04> (2004, accessed 24 March 2016).
11. Kvedar J, Coye MJ and Everett W. Connected health: a review of technologies and strategies to improve patient care with telemedicine and telehealth. *Health Aff* 2014; 33(2): 194–199.
12. Murray E. eHealth: where next? *Br J Gen Pract* 2014; 64(624): 325–326.
13. Bishop TF, Press MJ, Mendelsohn JL, et al. Electronic communication improves access, but barriers to its widespread adoption remain. *Health Aff* 2013; 32(8): 1361–1367.
14. University of Bristol. Alt-Con project, <http://www.bristol.ac.uk/primaryhealthcare/researchthemes/alt-con/> (2015, accessed 29 March 2016).
15. Price C. Patients give thumbs up to GP Skype pilot, <http://www.pulsetoday.co.uk/home/finance-and-practice-life-news/patients-give-thumbs-up-to-gp-skype-pilot/20009161.fullarticle> (2015, accessed 13 October 2016).
16. Andreassen HK, Kjekshus LE and Tjora A. Survival of the project: a case study of ICT innovation in health care. *Soc Sci Med* 2015; 132(0): 62–69.
17. Halford S, Lotherington AT, Obstfelder A, et al. Getting the whole picture? *Inf Commun Soc* 2010; 13(3): 442–465.
18. Greenhalgh T, Kyriakidou O and Peacock R. How to spread good ideas: a systematic review of the literature on diffusion, dissemination and sustainability of innovations in health service delivery and organisation, [http://www.netscc.ac.uk/hsdr/files/project/SDO\\_FR\\_08-1201-038\\_V01.pdf](http://www.netscc.ac.uk/hsdr/files/project/SDO_FR_08-1201-038_V01.pdf) (2009, accessed 29 March 2016).
19. Nijland N, van Gemert-Pijnen JE, Boer H, et al. Increasing the use of e-consultation in primary care: results of an online survey among non-users of e-consultation. *Int J Med Inform* 2009; 78(10): 688–703.
20. Hanna L and Fairhurst K. Using information and communication technologies to consult with patients in Victorian primary care: the views of general practitioners. *Aust J Prim Health* 2013; 19(2): 166–170.

21. Atherton H, Pappas Y, Heneghan C, et al. Experiences of using email for general practice consultations: a qualitative study. *Br J Gen Pract* 2013; 63(616): e760–e767.
22. Cohn A. The benefits of encouraging patients to email their doctor: a review of individual practice. *Arch Dis Child Educ Pract Ed* 2014; 99(4): 152–156.
23. van Gurp J, van Selm M, van Leeuwen E, et al. Transmural palliative care by means of teleconsultation: a window of opportunities and new restrictions. *BMC Med Ethics* 2013; 14: 12.
24. Najera C, Ivorra J, Chalmeta I, et al. Activity of telephone consultation to nursing by request in rheumatology. *Ann Rheum Dis* 2013; 72(3): A1090.
25. Ortega E, José Manuel G, María V, et al. eHealth usage patterns of European general practitioners: a five-year (2002–2007) comparative study. *Int J Med Inform* 2010; 79(8): 539–553.
26. Newhouse N, Lupiáñez-Villanueva F, Codagnone C, et al. Patient use of email for health care communication purposes across 14 European countries: an analysis of users according to demographic and health-related factors. *J Med Internet Res* 2015; 17(3): e58.
27. Hansen CS, Christensen KL and Ertmann R. Patients and general practitioners have different approaches to e-mail consultations. *Dan Med J* 2014; 61(6): A4863.
28. Huibers L, Koetsenruijter J, Grol R, et al. Follow-up after telephone consultations at out-of-hours primary care. *J Am Board Fam Med* 2013; 26(4): 373–379.
29. Raven M, Butler C and Bywood P. Video-based telehealth in Australian primary health care: current use and future potential. *Aust J Prim Health* 2013; 19(4): 283–286.
30. Campbell JL, Fletcher E, Britten N, et al. The clinical effectiveness and cost-effectiveness of telephone triage for managing same-day consultation requests in general practice: a cluster randomised controlled trial comparing general practitioner-led and nurse-led management systems with usual care (the ESTEEM trial). *Health Technol Assess* 2015; 19(13): 1–212.
31. Holt T, Fletcher E, Warren F, et al. Telephone triage systems in UK general practice: analysis of consultation duration during the index day in a pragmatic randomised controlled trial. *Br J Gen Pract* 2016; 66(644): 214–218.
32. Travers CP and Murphy JF. Neonatal telephone consultations in the National Maternity Hospital. *Ir Med J* 2014; 107(8): 251–252.
33. Majeed A. Data from one GP to inform the debate whether patients should be able to email their general practitioner. *BMJ* 2014; 349: 5766.
34. Armfield NR, Gray LC and Smith AC. Clinical use of Skype: a review of the evidence base. *J Telemed Telecare* 2012; 18(3): 125–127.
35. Crotty BH, Tamrat Y, Mostaghimi A, et al. Patient-to-physician messaging: volume nearly tripled as more patients joined system, but per capita rate plateaued. *Health Aff* 2014; 33(10): 1817–1822.
36. Pedersen KM, Andersen JS and Søndergaard J. General practice and primary health care in Denmark. *J Am Board Fam Med* 2012; 25(Suppl 1): S34–S38.
37. Raae V and Laursen EM. E-mail-konsultation til borgerne Praktiserende læger er gået online, [http://projekter.aau.dk/projekter/da/studentthesis/email-konsultation-til-borgerne\(c1858261-4cea-41f3-af42-226f62eda58b\).html](http://projekter.aau.dk/projekter/da/studentthesis/email-konsultation-til-borgerne(c1858261-4cea-41f3-af42-226f62eda58b).html) (2009, accessed 29 March 2016).
38. Facchiano L and Snyder CH. Challenges surrounding provider/client electronic-mail communication. *J Nurse Pract* 2011; 7(4): 309–315.
39. Ruiz IS, Garcia GP and Riquelme I. E-mail communication in pain practice: the importance of being earnest. *Saudi J Anaesth* 2014; 8(3): 364–367.
40. van Gurp J, Hasselaar J, van Leeuwen E, et al. Connecting with patients and instilling realism in an era of emerging communication possibilities: a review on palliative care communication heading to telecare practice. *Patient Educ Couns* 2013; 93(3): 504–514.
41. McKinstry B, Hammersley V, Burton C, et al. The quality, safety and content of telephone and face-to-face consultations: a comparative study. *Qual Saf Health Care* 2010; 19(4): 298–303.
42. Rimmer A. GP indemnity fees rise by 25% in a year, survey finds. *BMJ Careers*, [http://careers.bmj.com/careers/advice/GP\\_indemnity\\_fees\\_rise\\_by\\_25%2525\\_in\\_a\\_year\\_survey\\_finds](http://careers.bmj.com/careers/advice/GP_indemnity_fees_rise_by_25%2525_in_a_year_survey_finds) (2015, accessed 29 March 2016).
43. De Weger E, Macinnes D, Enser J, et al. Implementing video conferencing in mental health practice. *J Psychiatr Ment Health Nurs* 2013; 20(5): 448–454.
44. Rojjanasrirat W, Nelson EL and Wambach KA. A pilot study of home-based videoconferencing for breastfeeding support. *J Hum Lact* 2012; 28(4): 464–467.
45. Woolgar S. Configuring the user: the case of usability trials. In: Law J (ed.) *A sociology of monsters essays on power technology and domination*. London: Routledge, 1991, pp. 58–102.
46. Timmermans S. Resuscitation technology in the emergency department: towards a dignified death. *Sociol Health Illn* 1998; 20(2): 144–167.
47. Heath C, Luff P and Svensson MS. Technology and medical practice. *Sociol Health Illn* 2003; 25(3): 75–96.
48. Thistlethwaite J. Communication theory models—outside the face-to-face consultation. *InnovAiT* 2008; 1(7): 488–493.
49. May C, Mort M, Mair F, et al. Factors affecting the adoption of telehealthcare in the United Kingdom: the policy context and the problem of evidence. *Health Inform J* 2001; 7(3–4): 131–134.
50. Roter DL, Larson S, Sands DZ, et al. Can e-mail messages between patients and physicians be patient-centered? *Health Commun* 2008; 23(1): 80–86.
51. Pawlikowska T, Leach J, Lavalley P, et al. Consultation models. In: Charlton R (ed.) *Learning to consult*. Oxford: Radcliffe Publishing Ltd., 2007, pp. 178–215.
52. Stephenson A. The general practice consultation. In: Stephenson A (ed.) *A textbook of general practice*, 3rd ed. London: Hodder Arnold, 2011, pp. 17–28.
53. Merriel SWD, Salisburry C, Metcalfe C, et al. Depth of the patient–doctor relationship and content of general practice consultations: cross-sectional study. *Br J Gen Pract* 2015; 65(637): 545–551.



54. Wynn R, Bergvik S, Pettersen G, et al. Clinicians' experiences with videoconferencing in psychiatry. *Stud Health Technol Inform* 2012; 180: 1218–1220.
55. Wibe T, Hellesø R, Varsi C, et al. How does an online patient-nurse communication service meet the information needs of men with recently diagnosed testicular cancer? *ISRN Nurs* 2012; 2012: 260975.
56. Charlton R. Physical examination. In: Charlton R (ed.) *Learning to consult*. Oxford: Radcliffe Publishing Ltd., 2007, pp. 43–55.
57. Sihota J, Shannon S and Bhattacharyya A. History taking. In: Charlton R (ed.) *Learning to consult*. Oxford: Radcliffe Publishing Ltd., 2007, pp. 10–29.
58. Jiwa M and Meng X. Video consultation use by Australian general practitioners: video vignette study. *J Med Internet Res* 2013; 15(6): e117.
59. Scharff JS. Clinical issues in analyses over the telephone and the internet. *Int J Psychoanal* 2012; 93(1): 81–95.
60. Foster J, Jessopp L and Dale J. Concerns and confidence of general practitioners in providing telephone consultations. *Br J Gen Pract* 1999; 49(439): 111–113.
61. Little P, White P, Kelly J, et al. Randomised controlled trial of a brief intervention targeting predominantly non-verbal communication in general practice consultations. *Br J Gen Pract* 2015; 65(635): 351–356.
62. Little P, White P, Kelly J, et al. Verbal and non-verbal behaviour and patient perception of communication in primary care: an observational study. *Br J Gen Pract* 2015; 65(635): 357–365.
63. Blumenthal D. *Expecting the unexpected: health information technology and medical professionalism. Medical professionalism: does sharing on the Internet affect people's health in the new information age?* New Jersey: Rutgers University Press, 2010, pp. 8–23.
64. Greenhalgh T. Spreading and sustaining good ideas in healthcare, [http://www.nets.nihr.ac.uk/\\_data/assets/pdf\\_file/0020/82433/A1-08-1201-038.pdf](http://www.nets.nihr.ac.uk/_data/assets/pdf_file/0020/82433/A1-08-1201-038.pdf) (2004, accessed 29 March 2016).
65. Greenhalgh T, Swinglehurst D and Stones R. Rethinking resistance to big IT: a sociological study of why and when healthcare staff do not use nationally mandated information and communication technologies. *Health Serv Deliv Res* 2014; 2(39).
66. May C. Normalization Process Theory: understanding the dynamics of complex healthcare interventions, <http://www.normalizationprocess.org/what-is-npt/> (2009, accessed 29 March 2016).
67. Keown OP, Parston G, Patel H, et al. Lessons from eight countries on diffusing innovation in health care. *Health Aff* 2014; 33(9): 1516–1522.
68. Van Gurp JLP, Hasselaar J, Vissers K, et al. How technologized care can lead to compassionate professional involvement: a longitudinal, qualitative multiple case study about teleconsultation in palliative home care. *Palliat Med* 2014; 28(6): 587.
69. Mehrotra A, Paone S, Martich GD, et al. A comparison of care at e-visits and physician office visits for sinusitis and urinary tract infection. *JAMA Intern Med* 2013; 173(1): 72–74.
70. Goodyear-Smith F, Wearn A, Everts H, et al. Pandora's electronic box: GPs reflect upon email communication with their patients. *Inform Prim Care* 2005; 13(3): 195–202.
71. Neville RG, Marsden W, McCowan C, et al. A survey of GP attitudes to and experiences of email consultations. *Inform Prim Care* 2004; 12(4): 201–206.
72. MacNeill V, Sanders C, Fitzpatrick R, et al. Experiences of front-line health professionals in the delivery of telehealth: a qualitative study. *Br J Gen Pract* 2014; 64(624): 401–407.
73. Roland M, Barber N, Imison C, et al. The future of primary care: creating teams for tomorrow, <https://www.hee.nhs.uk/our-work/hospitals-primary-community-care/primary-community-care/primary-care-workforce-commission> (2015, accessed 29 March 2016).
74. Hanna L, May C and Fairhurst K. The place of information and communication technology-mediated consultations in primary care: GPs' perspectives. *Fam Pract* 2012; 29(3): 361–366.
75. Hendy J, Fulop N, Reeves BC, et al. Implementing the NHS information technology programme: qualitative study of progress in acute trusts. *BMJ* 2007; 334(7608): 1360.
76. Hendy J, Reeves BC, Fulop N, et al. Challenges to implementing the national programme for information technology (NPfIT): a qualitative study. *BMJ* 2005; 331(7512): 331–336.
77. Johansson AM, Lindberg I and Soderberg S. The views of health-care personnel about video consultation prior to implementation in primary health care in rural areas. *Prim Health Care Res Dev* 2014; 15(2): 170–179.
78. Hakimnia R, Holmstrom IK, Carlsson M, et al. Exploring the communication between telenurse and caller – a critical discourse analysis. *Int J Qual Stud Health Well-Being* 2014; 9: 24255.
79. Tjora A. The technological mediation of the nursing-medical boundary. *Sociol Health Illn* 2000; 22(6): 721–741.
80. Segar J, Rogers A, Salisbury C, et al. Roles and identities in transition: boundaries of work and inter-professional relationships at the interface between telehealth and primary care. *Health Soc Care Community* 2013; 21(6): 606–613.
81. Pols J. The heart of the matter. about good nursing and telecare. *Health Care Anal* 2010; 18(4): 374–388.
82. Pols J. *Care at a distance: on the closeness of technology*. Amsterdam: Amsterdam University Press, 2012.
83. Varsi C, Gammon D, Wibe T, et al. Patients' reported reasons for non-use of an Internet-based patient-provider communication service: qualitative interview study. *J Med Internet Res* 2013; 15(11): e246.
84. Gupta SG. Tips for telephone and electronic medical consultation. *Indian J Pediatr* 2013; 80(11): 944–948.
85. Brewster L, Mountain G, Wessels B, et al. Factors affecting front line staff acceptance of telehealth technologies: a mixed-method systematic review. *J Adv Nurs* 2014; 70(1): 21–33.
86. Avey JP and Hobbs RL. Dial in: fostering the use of telebehavioral health services in frontier Alaska. *Psychol Serv* 2013; 10(3): 289–297.

87. Knapp M. Tele-video consultations: a useful adjunct for regional nephrology? *Nephrology* 2013; 18: 62.
88. Markus PA and Leatherwood SM. How to safely communicate by e-mail with patients. *J Med Assoc Ga* 2012; 101(3): 38.
89. Plener I, Hayward A and Saibil F. E-mail communication in the management of gastroenterology patients: a review. *Can J Gastroenterol Hepatol* 2014; 28(3): 161–165.
90. Ilyas F. From ‘doctor brides’ to practicing physicians. *The Express Tribune*, <http://tribune.com.pk/story/969805/doctors-from-doctor-brides-to-practicing-physicians/> (2015, accessed 29 March 2016).
91. Roland M and Paddison C. Better management of patients with multimorbidity. *BMJ* 2013; 346: f2510.
92. Kaffash J. Drive to recruit non-GPs accelerates, <http://www.pulsetoday.co.uk/your-practice/drive-to-recruit-non-gps-accelerates/20010614.fullarticle> (2015, accessed 20 March 2016).
93. Drennan VM, Halter M, Joly L, et al. Physician associates and GPs in primary care: a comparison. *Br J Gen Pract* 2015; 65(634): 344–350.
94. Hooker RS, Cawley JF and Leinweber W. Career flexibility of physician assistants and the potential for more primary care. *Health Aff* 2010; 29(5): 880–886.
95. Windrush Medical Practice. Physician’s Assistant up to 37.5 hours per week, [http://www.windrushmedicalpractice.co.uk/physician\\_s\\_assistant\\_up\\_to\\_37\\_5\\_hours\\_per\\_week\\_t133215.html?a=0](http://www.windrushmedicalpractice.co.uk/physician_s_assistant_up_to_37_5_hours_per_week_t133215.html?a=0) (2016, accessed 29 March 2016).
96. De Haes JC, Oort FJ and Hulsman RL. Summative assessment of medical students’ communication skills and professional attitudes through observation in clinical practice. *Med Teach* 2005; 27(7): 583–589.
97. Haun NJ, Lind DJ, Shimada LS, et al. Evaluating user experiences of the secure messaging tool on the veterans affairs’ patient portal system. *J Med Internet Res* 2014; 16(3): e75.
98. Houston TK, Sands DZ, Jenckes MW, et al. Experiences of patients who were early adopters of electronic communication with their physician: satisfaction, benefits, and concerns. *Am J Manag Care* 2004; 10(9): 601–608.
99. Andreassen HK. What does an e-mail address add? Doing health and technology at home. *Soc Sci Med* 2011; 72(4): 521–528.
100. Gray JAM and Rutter H. *The resourceful patient*. Oxford: eRosetta Press, 2002.
101. Lupiañez-Villanueva F, Maghiros I and Abadie F. Strategic intelligence monitor on personal health systems phase 2 (SIMPHE 2) citizens and ICT for health in 14 EU countries: results from an online panel, <http://ftp.jrc.es/EURdoc/JRC71142.pdf> (2012, accessed 29 March 2016).
102. Winthereik BR and Langstrup H. When patients care (too much) for information. In: Mol A, Moser I and Pols J (eds) *Care in practice: on tinkering in clinics, homes and farms*. Bielefeld: Transcript Verlag, 2010, pp. 195–214.
103. Santana S, Lausen B, Bujnowska-Fedak M, et al. Online communication between doctors and patients in Europe: status and perspectives. *J Med Internet Res* 2010; 12(2): e20.
104. The Cullen Project. The medical consultation letters of Dr William Cullen, <http://www.cullenproject.ac.uk/> (2016, accessed 29 March 2016).