

# ► The technical and interpersonal aspects of telemedicine: effects on doctor–patient communication

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### Summary

The influence of telemedicine on the nature and content of doctor–patient communication stems from both its technical and its interpersonal aspects. While the technical aspects are concerned with the communication technologies used and the clinical processes enabled by those technologies, the interpersonal aspects are concerned with relationships between system personnel, providers and patients, and the way in which those relationships are organized. On the one hand, this paper posits that the influence of the technical environment stems from depersonalization of the doctor–patient relationship, participatory enhancements and impediments, and sensory and non-verbal limitations. On the other hand, it posits that the influence of the interpersonal environment stems from third-party participation, social and professional distancing, and underdeveloped norms and standards. A combined positivist and interpretivist evaluation strategy would enable researchers to make better-informed connections between telemedicine, medical encounter behaviour and health outcomes.

### Introduction

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Telemedicine may be defined as the use of telecommunication in the delivery of health services to enable provider–patient and provider–provider consultation despite geographical separation. Comparatively little research has examined the effect of telemedicine on the cost, quality and accessibility of health-care<sup>1</sup>. Not surprisingly, therefore, only a handful of studies have considered the relationship between telemedicine and the nature and content of doctor–patient communication<sup>2</sup>.

As a first step towards encouraging further research in this area, I drew on the broader doctor–patient communication literature to propose a conceptual model which posits that characteristics of the patient, of the provider and of the context of the medical encounter influence participants' behaviour within it,

and that this behaviour, in turn, affects health outcomes, including patient compliance, satisfaction, recall, understanding, health status and psychological wellbeing<sup>3</sup>. The model also posited that the manner in which this process unfolds depends, in part, on the medium through which consultation takes place, whether that is in person, by telephone, via fax or email, or through two-way interactive video. In this paper I elaborate on the technical and interpersonal aspects of telemedicine to show how two-way interactive video affects medical encounter behaviour.

The technical aspects are primarily concerned with the communication technologies used (including hardware, software, standards and support services), as well as the clinical processes enabled by those technologies (including case finding, diagnosis, treatment and follow-up). The interpersonal aspects, on the other hand, are primarily concerned with relationships between system personnel, providers and patients, as well as the way in which those relationships are organized. Although these categories are not necessarily mutually exclusive, they provide a useful way of thinking about how telemedicine might affect communication and the doctor–patient relationship.

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## Technical aspects

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### Depersonalization of the doctor–patient relationship

Observers like Evans<sup>4</sup> believe that ‘technology has stripped medicine of its humanistic qualities’, and that the doctor–patient relationship has become more impersonal as physicians increasingly rely on high-tech instruments during their encounters with patients. Since telemedicine relies on advanced communication technologies, it would seem to continue the trend towards greater depersonalization in health-care. This has been a concern of researchers who fear that ‘telemedicine may be mechanistic and interfere with the development of a personal physician–patient relationship’<sup>5</sup>, or that providers may not be able to establish rapport with remote clients because of the impersonal nature of the service<sup>6</sup>. It has also been suggested<sup>7</sup> that videoconferencing ‘has a voyeuristic sense of promoting detachment or dissociation from the other participant, thereby impairing an essential clinical tool—empathy’.

Unlike face-to-face encounters, in which doctors and patients are both located in the same setting (e.g. hospital, nursing home, office or clinic), telemedicine participants usually use specially equipped rooms in their respective facilities. Stoockle<sup>8</sup> argued that when institutional office space is used by a large number of physicians it is typically ‘devoid of personal mementos that might suggest the individuality of the practitioner’, and therefore provides no or little insight into practitioner personality and other attributes. Since a telemedicine ‘hub’ room is commonly used by many different providers, it is often standardized in appearance, and therefore does not provide the remote patient with any clues about their physician’s human qualities. This may increase not only the psychological distance between the two but also patient distrust, and therefore expose physicians to greater risk of malpractice litigation. It may also compromise patient outcomes if it increases dissatisfaction and non-compliance with treatment protocols.

It should be stressed, however, that greater depersonalization is not always a bad thing. For example, McLaren *et al.*<sup>9</sup> found that psychiatric patients felt less inhibited in discussing their problems in a video-consultation than face to face. Greater anonymity may also encourage reluctant patients with stigmatized diseases (e.g. sexually transmitted infections) to seek treatment earlier than they might otherwise. In certain cases, therefore, the distancing effect of telemedicine can create a less threatening environment than exists with face-to-face encounters. Some believe that it may

also infuse physicians’ advice and information with greater respect and authority than otherwise would be the case<sup>5</sup>.

Even the need to share institutional space can similarly have advantages. Not only can it provide an environment free of the usual distractions of ringing telephones and interruptions by office and other clinical personnel, but it may also provide patients and other participants with the sense that a particular time and place had been set aside specially for them and their problems and concerns. Gammon *et al.*<sup>10</sup>, for example, found that moving psychotherapy supervision to a neutral space away from supervisors’ offices proved beneficial by providing fewer interruptions and more time for junior doctors to ‘clear their heads’. Telemedicine may also be less stressful for patients who otherwise would have to travel long distances to attend their appointments.

Although video-consultations are likely to be more impersonal than face-to-face consultations, they are more personal than consultations that take place entirely by telephone. As Cukor *et al.*<sup>11</sup> observed with respect to psychiatric consultations, the added value of the video-channel is the creation of a ‘social presence’ that allows consultation participants to share a virtual space and to feel comfortable when discussing complex issues. This is a finding that has been replicated by others, who found, for example, that patients appeared more anxious in non-visual modes than when visual cues were present<sup>12</sup>.

### Participatory enhancements and impediments

The unique aspects of telemedicine can empower patients and increase their control over the medical encounter. For example, telemedicine often requires greater patient participation since consulted physicians are unable to perform the same physical examination that they could during a face-to-face encounter. Telemedicine systems may also expand on the conventional array of verbal and non-verbal communication possibilities by giving patients and providers control over aspects of the video pictures transmitted. For example, various systems might allow patients to ‘zoom in’ and ‘zoom out’, or remove themselves or the consulting physician from their video-screen entirely. Although vendors typically provide ‘hub’ physicians with this capability more often than they do patients, patients sometimes have the option of continuing consultations even if they turn their camera off. This is one reason why psychiatric patients in a 1993 study found video-interviews to be less threatening than face-to-face interviews<sup>13</sup>.

Other aspects of the technology may also increase patient enthusiasm and participation. Not only did telemedicine technology generate positive excitement among patients during remote endoscopic examinations, for example, but it also allowed them to view their own images, which increased their sense of participating in those encounters<sup>14,15</sup>. Similarly, psychiatric patients in a study by Baigent *et al.*<sup>16</sup> rated video-interviews more enjoyable than in-person interviews, while subjects in a psychiatric study by Gammon *et al.*<sup>10</sup> found it 'inspiring to be confronted with a new mode of communication'. Although enthusiasm with new technologies dissipates with time, greater use creates familiarity that may increase long-term comfort and acceptance for some.

Nonetheless, some aspects of the technology probably increase anxiety and discomfort among certain participants, who may then become more self-conscious and inhibited. This is particularly a risk with patients whose images, clinical information and other intimate details are being recorded and transferred between sites. This comparative lack of privacy associated with telemedicine may hinder patient communication during some encounters.

Being on camera can also make some clinicians uncomfortable. While Allen and Doolittle<sup>17</sup> suggested that 'some medical practitioners may need special training to overcome deficits in their ability to communicate or to project subtle aspects of their personality (e.g. warmth and caring) over a video system', they doubted that others would ever become comfortable with two-way interactive video. This is especially important because lack of confidence on the part of physicians may affect patient trust and outcomes, particularly satisfaction and adherence to treatment. It is also important because video can magnify a 'consultant's urgency to move on, or arrogance, to such a degree that it alienates the provider and patient at the referring end'<sup>18</sup>. Physician comfort and confidence may also be compromised by uncertain malpractice risks<sup>19</sup>.

Although the cost of information transmission has come down substantially, teleconsultations are sometimes more costly than conventional encounters. This is particularly true of rural systems where the high costs of transmission, training and systems integration combine with low utilization to yield high unit costs<sup>1</sup>. The result is often pressure to use systems as efficiently and productively as possible. To keep to consultation times, therefore, clinicians may provide patients with comparatively few opportunities to participate during telemedicine encounters.

The amount and quality of doctor-patient interaction will be further diluted if technical problems arise and attention is diverted while the doctor has to consult with technicians. As it is, physicians often fail

to elicit patients' worries or reasons for consultation<sup>20</sup>, or allow them time to express their concerns<sup>21</sup>. They also tend to spend little time informing their patients (approximately 1 min in 20 min encounters), while overestimating the time they do spend giving information (by a factor of nine)<sup>22</sup>. Less active patient involvement is likely to leave little time for psychosocial exchange, which may compromise patients' psychological state and satisfaction, not to mention the ability of providers to detect social problems. This has been a concern of some telemedicine observers who have suggested that with 'less time available, stress is placed on efficiently gathering appropriate medical information—perhaps at the expense of the relationship building that is so important to the patient's sense of well being'<sup>23</sup>.

### Sensory and non-verbal limitations

Twenty-one of 23 categories in a recent review of doctor-patient communication in telemedicine were reported to have more positive than negative results<sup>24</sup>. The two that did not—non-verbal behaviour and lack of touch—highlight the fact that telemedicine is primarily a visual and auditory medium. Consulting clinicians cannot touch or smell the patient, although both senses are used to varying degrees during in-person encounters. Lack of access to tactile and olfactory information may compromise a physician's ability to make diagnoses, while lowering confidence in the diagnoses made. Some people consider this a major limitation in using two-way interactive video<sup>25</sup>, although most of the core sensory data used in clinical decision making is in fact visual and auditory in nature.

The absence of the 'laying on of the hands', however, may adversely affect the emotional and psychological bond between doctors and patients. A number of qualities have been associated with this aspect of the physical examination beyond the placebo effect, including a sense of comfort, relaxation, self-assertion and pleasure<sup>26</sup>. Most experts, for example, recommend that physicians should break bad news in person, that they should sit close to their patients, avoid physical barriers and rely on touch when appropriate<sup>27</sup>. The separation inherent in two-way interactive video makes following this prescription on the part of consultants impossible. While transmission of tactile data is experimental (e.g. the virtual glove), transmission of odours and flavours has largely been unexplored<sup>28</sup>.

Separation between consultation participants sometimes compromises the richness and complexity of visual and auditory information as well. This is particularly true with respect to non-verbal communication, which includes voice quality and tone, eye contact, gaze, posture, laughter, facial expressions, body

positioning, proximity, touch, activity (e.g. chart reviewing and computer usage) and other cues that modify the meaning of verbal utterances (e.g. hesitations). The effect of telemedicine on non-verbal communication has primarily been explored in the area of telepsychiatry, where studies highlight the importance of non-verbal cues for expressing emotion and affect. But, as McLaren and Ball<sup>29</sup> observed, 'the tasks which would be expected to be most sensitive to the medium of communication [i.e. non-verbal communication] are tasks in which the expression and perception of emotion are important'. Cukor *et al.*,<sup>11</sup> for example, concluded that although most clinical information was carried on the audio channel, important non-verbal cues—nods, blinks, facial expressions and body language—were missing, possibly reducing the effectiveness of video as a tool for interpersonal communication. Ghosh *et al.*<sup>7</sup> came to a similar conclusion, noting that while neither participant seemed inhibited or uncomfortable in exploring issues, useful body language and appearance information was largely absent, while the therapist was unable to perform certain supportive gestures such as supplying a patient with a tissue. In some instances, visual information was lost when doctors checked their notes or leaned forward to convey intimacy or empathy<sup>9,12</sup>. In other instances, missing information made it difficult for patients to show side-effects or symptoms<sup>12</sup>. In certain cases, however, missing information actually facilitated interaction by removing potentially distractive behaviours from view<sup>9</sup>. In one study, consultants actually found it easier to detect certain clinical signs (i.e. tongue tremors) using video<sup>30</sup>. Of course, the quality of the equipment varies, which probably influences the extent to which sensory and non-verbal limitations inhibit interactions between doctors and patients.

## Interpersonal aspects

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### Third-party participation

Unlike most face-to-face consultations, telemedicine usually adds a second health-care professional—whether a general practitioner, a nursing practitioner or a physician assistant—to the consultation. As in face-to-face encounters that add a third party to the doctor-patient dyad, the result may be more information giving on the part of the consulting provider, but less emotional and psychosocial support and less patient involvement. Using interaction analysis, for example, Street *et al.*<sup>31</sup> concluded that in consultations with on-site general practitioners and off-site specialists, patients were the least active participants, making the fewest

utterances, asking the fewest questions, exerting the least control and receiving the least amount of information. Not only may patients participate less in such encounters, but there is also a concern that attendants and consultants may communicate with each other to the exclusion of patients, which may decrease patient trust, satisfaction and adherence to treatment protocols.

A third party, on the other hand, can help compensate for some of the interpersonal deficits associated with two-way interactive video-consultations, for example by making up for the loss of non-verbal cues during psychiatric consultations<sup>32</sup>, supporting patients through difficult oncology consultations (e.g. treatment failure, tumour recurrence)<sup>17</sup>, focusing on the social and emotional dimensions of patient care during endoscopic examinations<sup>15</sup>, and compensating for the loss of tactile and other sensory deficits that may compromise rapport and diagnostic reliability<sup>23</sup>.

On-site practitioners are also able to mediate between the 'everyday' language of patients and the medical language and technical jargon of consultants and system coordinators. This latter dimension may not always be possible, however. Whitten and Allen<sup>33</sup>, for example, concluded that members of the University of Kansas Telemedicine Program did not share a common vocabulary for telemedicine matters. Not only could this hinder the effectiveness of such programmes, but it would also increase the role of site coordinators, with uncertain consequences for patient care and the doctor-patient relationship. Although they may not always be able to interpret for their patients, however, on-site practitioners may still serve as patient advocates, while increasing patient confidence in the quality of care received (i.e. because 'two doctors are better than one').

### Social and professional distancing

Telemedicine often brings together unfamiliar combinations of patients and clinicians. Not only are remote patients less likely to know their consulting providers, but they are also less likely to come from similar social, economic, cultural and linguistic backgrounds.

Without telemedicine, for example, rural residents often rely exclusively on local providers because of the great distances that would otherwise have to be travelled to consult with specialists at urban medical centres. With telemedicine, however, rural residents can consult with tertiary care specialists without leaving their local communities. Regions with telemedicine therefore probably experience more contact between rural patients and urban physicians than regions that rely exclusively on conventional consultation modes. Since urban carers are less likely to derive from similar backgrounds as rural patients and are less

likely to appreciate the social and psychological circumstances of their patients' lives, greater social distance exists between participants during the average teleconsultation than during the average face-to-face encounter. Unfortunately, social distance has been shown to compromise the development of rapport and other aspects of the communication process, including the amount of psychosocial exchange that takes place. The effect of social distance may be further compounded because working-class patients are more likely to communicate their desire for information using non-verbal cues<sup>22</sup>, and such cues are often difficult, if not impossible, to detect and interpret when consultations occur over two-way interactive video.

In other ways, however, telemedicine may actually reduce social distance between doctors and patients by placing them on more equal ground. It is often easier and less intimidating to engage with someone of 'higher status' and authority when one is not in the same room as them, for example.

Similar issues exist between presenting generalists and consulting specialists, which stem, in part, from differences in professional training, philosophy and status. Differences in ideology, in particular, often make communication difficult. While specialists tend to focus primarily on biomedical issues, generalists, including nurses and other primary care practitioners, tend to adopt a broader view of health that also includes a concern for their patients' psychosocial environments.

This is a point highlighted by Mathews<sup>34</sup>, who argues that communication between doctors and nurses is tricky because of philosophical differences about what ought to be shared with patients and who should give that information. Wells and Lemak<sup>35</sup> argue, moreover, that the usual differences between generalists and specialists are further complicated with telemedicine because 'rural and urban physicians often differ in their practice patterns, communication styles and expectations about patients'. The anticipation of difficulties in communicating with consulting specialists may make some rural physicians uneasy about using telemedicine. Resulting interpersonal difficulties may be surmounted, however, if participating physicians already know and respect each other. This is illustrated by a study by Gammon *et al.*<sup>10</sup>, who found that a precondition of satisfactory psychotherapy supervision was that off-site supervisors and on-site junior doctors had first met in person and established a trusting, respectful relationship.

### Underdeveloped norms and standards

Both doctors and patients have been socialized to behave in certain ways. But because this socialization

took place through repeated exposure to face-to-face consultations, there is uncertainty about how they should behave in teleconsultations. Hesitancy, anxiety and conflict probably result as doctors and patients try to negotiate this comparatively unfamiliar terrain. For telemedicine to reach its potential, therefore, normative standards of behaviour need to be developed to replace the norms of face-to-face contact<sup>36</sup>.

Some of these may develop naturally. For example, Whitten and Doolittle<sup>37</sup> observed that 'a new type of etiquette emerges via interactive video where participants are less likely to interrupt each other'. A similar result was reported in a study by Ghosh *et al.*<sup>7</sup> where participants adjusted to audio delays in video-transmissions by using shorter sentences and waiting before replying. Although relatively minor, these examples illustrate how deeper, more all-encompassing norms of behaviour can develop spontaneously over time.

Standards of behaviour may also be promulgated formally. Outside of teleradiology, however, few technical standards and clinical guidelines exist<sup>1</sup>. This is a point reinforced by Loane and Wootton<sup>38</sup>, who identified few telemedicine guidelines, particularly at an international level. Not surprisingly, therefore, observers such as Bashshur<sup>39</sup> have emphasized the need for 'establishing norms of professional conduct for quality performance and guidelines for clinical practice', including a formal and explicit triage system, code of ethics, and outcome-based criteria and standards. Implementing such standards, however, is more difficult than it sounds. As the Joint Working Group on Telemedicine<sup>1</sup> pointed out in its report to Congress, 'telemedicine technology is changing so rapidly that there are few formal standards or benchmarks to guide its use or technological development'.

Another option is to focus on the formulation and promulgation of behavioural norms that maximize the effectiveness of the encounter from both the doctor's and patient's perspective. There is a long history of designing, implementing and evaluating interventions to influence doctor-patient behaviour. It is in fact surprisingly simple and inexpensive to make changes that significantly alter the processes and outcomes of medical encounters<sup>40</sup>. Interventions usually fall into two general categories: skill training and education. While most successful interventions for patients increase their confidence in their knowledge and ability to participate actively in their own medical affairs, most successful interventions for physicians focus on promoting an appreciation of patients' experiences and insights. A number of studies, for example, show the positive effect that increased information and preparedness can have on reducing stress related to unpleasant medical examinations (e.g.

endoscopy, cast removal or pelvic examinations)<sup>41</sup>. Perhaps similar interventions could increase patient and provider comfort with unfamiliar consultation modalities such as telemedicine.

Additional training may also be needed to increase clinical effectiveness. Doolittle and Allen<sup>42</sup>, for example, suggested that medical practitioners may need special training to overcome communication difficulties with telemedicine, while non-physician providers may need training in patient presentation and diagnosis. McLaren *et al.*<sup>9</sup> added that clinicians may also need training to use the self-view monitor to stay in frame and to provide others with feedback on doing the same.

Rather than waiting for behavioural norms to arise naturally or as a result of the adoption of formal standards or clinical interventions, another option is to adapt telemedicine technologies to existing behavioural patterns through improvements in the human–technology interface. This is the sphere of human factors engineering<sup>43</sup>. The more accommodating the human–machine interface is to existing consultation norms, the more acceptable telemedicine is likely to be to patients and providers. Not only would more user-friendly equipment ease patient trepidation about an otherwise unfamiliar consultation modality, but it would also facilitate the incorporation of telemedicine into existing medical practice more generally.

## General evaluation strategy

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Teleconsultations differ in important ways from conventional, face-to-face consultations. These differences arise from the technical and interpersonal aspects of telemedicine and include depersonalization of the doctor–patient relationship, participatory enhancement and impediments, sensory and non-verbal limitations, third-party participation, social and professional distance, and underdeveloped norms and standards. It is clear, then, that videoconferencing differs in important ways from face-to-face contact as a consultation medium. But does telemedicine influence health outcomes through changes in the form and content of doctor–patient communication? And if so, how? In order to make better-informed connections between aspects of the telemedicine environment, behaviour in the medical encounter and health outcomes, concrete data are required. A combined positivist and interpretivist strategy using quantitative and qualitative research methods would serve this purpose well, where positivist research focuses on theory testing and interpretivist research focuses on theory generation.

Constructs and categories from the broader literature on doctor–patient communication necessarily inform one’s thinking regarding the relationship between telemedicine, doctor–patient communication and health outcomes<sup>41</sup>. To the extent that researchers use these concepts to study the relationship between telemedicine and behaviour in medical encounters, the approach is positivist and verifying in nature. However, the aim is more theory generation and interpretivist in nature to the extent that researchers also use observation, interviews and ‘thick’ (i.e. in-depth) description to try to understand doctor–patient communication within the unique confines of telemedicine, and adjust extant interaction analysis instrument categories to this unique environment or develop new ones. Adapting pre-existing knowledge, therefore, is one way in which researchers should combine positivist and interpretivist philosophies when evaluating the impact of telemedicine on doctor–patient communication and, in turn, health outcomes.

A second way in which to combine the positivist and interpretivist perspectives has been outlined by Lin<sup>44</sup>. While the positivist strategy allows one to identify causal relationships that exist among variables (e.g. telemedicine leads to more positive talk which results in higher patient satisfaction compared with face-to-face encounters), the interpretivist strategy enables one to identify the causal mechanisms that actually connect variables identified as related (e.g. telemedicine requires the involvement of at least two health-care providers, one on-site and one off-site, and this provides the patient with a greater sense of ‘being paid attention to’, which results in a more gratifying experience emotionally and high ratings on patient satisfaction scales). Whereas a positivist strategy might enable researchers to identify possible causal relations among aspects of the telemedicine environment, doctor–patient communication and health outcomes, it is the intensity of the interpretivist model which would allow telemedicine researchers to detail the causal mechanisms that provide the explanations necessary to conclude whether a set of relationships is theoretically and substantively significant.

Inui and Carter<sup>45</sup> observed that ‘nearly all studies in provider–patient communication have been descriptive and correlational in design’. To the extent that causal arguments have been made, researchers have relied solely on theory and/or statistical controls. The only exceptions include randomized controlled experiments that have examined the effect, on health-care processes and sometimes outcomes, of various interventions to facilitate doctor–patient communication<sup>46</sup>. Given the dearth of research that identifies both causal relationships and causal mechanisms within the same study, a combined positivist and interpretivist evaluation

strategy that investigates the relationship between telemedicine, medical encounter interaction and health outcomes, would make a valuable contribution not only to the telemedicine community but also to the broader doctor-patient communication literature more generally.

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