

Videoconferencing in psychiatry: a survey of use in northern Norway

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Summary

A survey of the use of videoconferencing in mental health care was carried out in northern Norway. A questionnaire was distributed to all user institutions in northern Norway at the same time that ISDN became available, in mid-1995. The questionnaire completion rate for locations recorded as participants in videoconferencing sessions was 62%. Within six months, a total of 1028 persons had participated in 140 videoconferencing sessions from 35 institutions. The purposes of videoconferencing included meetings (50%), supervision, training and teaching (31%), clinical consultations (14%) and tests or demonstrations (5%). The alternative forms of contact which videoconferencing replaced included travel (59%), no contact (25%), telephone (14%), and mail or fax (2%). No problems were reported in 55% of the sessions; in 19% there were audio problems, in 14% there were picture problems, in 5% attempts to connect failed and in 5% disconnection occurred. The majority of users (87%) reported that they were satisfied or very satisfied with the facility; 8% were uncertain and 5% were less satisfied or totally dissatisfied. Continued surveying will provide longitudinal data on the diffusion of telepsychiatry in northern Norway.

Introduction

Telemedicine began in northern Norway in 1988 with the assistance of Norwegian Telecom (now named Telenor). In 1993, with the support of the Ministry of Health and Welfare, the Department of Telemedicine at the University Hospital in Tromsø was established, and is now a leader in telemedicine in Norway. The ratio of patients to specialist doctors in northern Norway is 1194:1, compared with 294:1 in southern Norway. Telemedicine efforts in northern Norway are motivated by the goal of equal access to quality health care for its population of 475,000.

In Norway clinical videoconferencing applications include telepathology, teleradiology, teledermatology, tele-otorhinolaryngology, telecardiology, telegeriatrics and telepsychiatry, in addition to distance teaching in these and other medical fields. The use of videoconferencing or interactive television in mental health care—also called telepsychiatry—has been sporadic, with the exception of County Finnmark, in which videoconfer-

encing was used systematically during the period 1990–92¹. In anticipation of ISDN becoming operative in northern Norway in mid-1995, efforts were made to ensure that the videoconferencing equipment acquired by the counties for telemedicine was accessible to professionals in mental health care. Today, there are approximately 50 videoconferencing or video-telephone units within health care in northern Norway. Fig 1 shows where these units are located (some places have several videoconferencing units—Tromsø alone has 10).

Approximately 35 of these units are available to workers in mental health care, while 15 of them are dedicated to mental health institutions. These include the two psychiatric hospitals in Bodø and Tromsø, and the various psychiatric centres and outpatient clinics.

An increasing number of studies have identified essential issues related to the quality and reliability of videoconferencing for patient diagnosis and treatment in psychiatry^{2,3}. An important parallel issue is that of diffusion: to what extent will professionals in mental health care accept and integrate this technology into their daily work? For this reason we have developed a method for monitoring the use of videoconferencing among health-care workers. The material presented in this article provides a preliminary indication of

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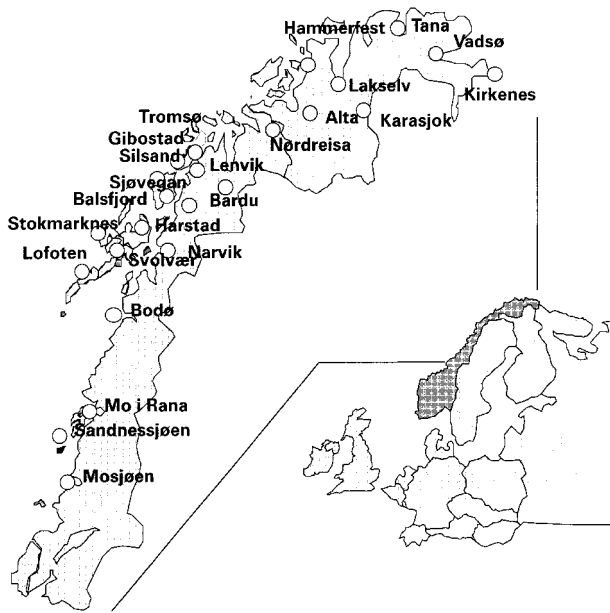


Fig 1 Videoconferencing locations in northern Norway.

acceptance and use among mental health professionals in northern Norway.

Technology and costs

Telemedicine applications in Norway were based on a 2 Mbit/s network called MegaNet until 1995. This service was replaced by ISDN, on which all subsequent applications, including telepsychiatry, have been based. In northern Norway there are 30 units capable of operating at 384 kbit/s (i.e. six ISDN channels) and 22 units that are limited to 128 kbit/s (two ISDN channels) (Table 1). Approximately 15 of the units, most of which are at hospitals and educational institutions, are equipped with document cameras of varying cost.

Most units acquired within the last two years are roll-abouts with easy-to-use hand-held remote controls. The average cost of these units is Nkr125,000 per unit (Nkr1 is US\$0.16, 0.12 ECU). Annual fixed set-up costs, including maintenance expenses and monthly access fees, are estimated to be Nkr47,000. This assumes a six-year depreciation for the videoconferencing unit, a 5% discount rate and a yearly maintenance cost of 10% of

the unit's purchase price. In addition, there is an annual operating cost in terms of the line charges for using the ISDN. The cost per hour regardless of distance within northern Norway is approximately Nkr50 for two channels and Nkr155 for six channels. For multipoint conferences (more than two locations connected simultaneously), the cost is approximately Nkr250 and Nkr510 per hour per location for two channels and six channels, respectively.

Implementation

Two of the three counties in northern Norway (Finnmark and Nordland) implemented videoconferencing at the various institutions as part of their general plans for telemedicine. In accordance with the Scandinavian tradition of worker/user involvement in the implementation of new technology, most decisions by managers to install the units were taken following the active involvement of, and/or explicit acceptance by, key clinical personnel.

An important factor common to nearly all health-care institutions which installed videoconferencing equipment was the appointment of a user support person who was responsible for coordination and user support. These persons combined the support role with their primary functions (ranging from health professionals and management personnel to information technology personnel and administrative secretaries). The time and training provided for these people—and the enthusiasm they showed in carrying out telemedicine support tasks—varied greatly, as did the number of users and telemedicine applications.

Most of the approximately 15 mental health institutions which had their own videoconferencing equipment had either been visited by staff of the Department of Telemedicine at the University of Tromsø or received a general orientation from them via videoconferencing. This included the use of telemedicine in psychiatry, experiences at other centres, and practical information (directory of ISDN numbers, contact persons, prices, etc.).

Apart from these factors, the approximately 35 videoconferencing units available to mental health care were not introduced to mental health professionals in any consistent manner, nor did they share common policies or procedures apart from those upon which psychiatry in general is based.

Table 1 Types of videoconferencing unit used in northern Norway

384 kbit/s equipment	No. of items	128 kbit/s equipment	No. of items
Philips Titan	16	Tandberg Vision	21
Tandberg Master Vision	8	Tandberg Grand Vision	1
Sony	6		
Totals	30		22

Methods

A questionnaire developed earlier by the Department of Telemedicine to monitor use of telemedicine was

adapted to include psychiatry (Appendix). Emphasis was placed on brevity (maximum one page) and clarity in order to increase the likelihood of users completing it. The questionnaire was distributed to all user institutions in northern Norway at the same time that ISDN became available. A letter was enclosed explaining its purpose along with instructions for use and the routines for returning the completed forms quarterly to the Department of Telemedicine. It was emphasized that the form would be revised and that critical comments from users would be considered in any revision. Those institutions that returned completed forms were offered the results of the survey in due course.

The forms were placed in the immediate vicinity of the videoconferencing monitor, usually on the table where the participants sat during conferences. It was the intention that a copy of the questionnaire be filled out immediately after each session by one of the participants (usually those responsible for the sessions) at each participating locality. Those who completed the form often, but not always, conferred with the other participants at the same locality while doing so (particularly regarding the satisfaction rating). Institutions failing to return completed forms by the agreed time were reminded by telephone.

Results

Results are based on 184 questionnaires completed by 26 mental health institutions in northern Norway from June to December 1995 (nine institutions outside the region did not receive questionnaires). The questionnaire completion rate at these locations was 62%.

Videoconferencing sessions

Fig 2 shows the number of telepsychiatry sessions per month from June to December 1995. There were 140 sessions in all, representing a total of 185 hours of videoconferencing, with a total of 1028 participants (an average of 7.8 persons per session). Nineteen of the sessions (14%) were to locations outside the region. Fourteen (10%) were multipoint conferences, involving between three and seven participating locations.

Institutions and participants

The Nordland Psychiatric Hospital in Bodø participated in 52 of the 140 videoconferencing sessions (37%) and the Åsgård Psychiatric Hospital in Tromsø participated in 41 (29%). The remaining 24 institutions (rural psychiatric centres and outpatient clinics) participated

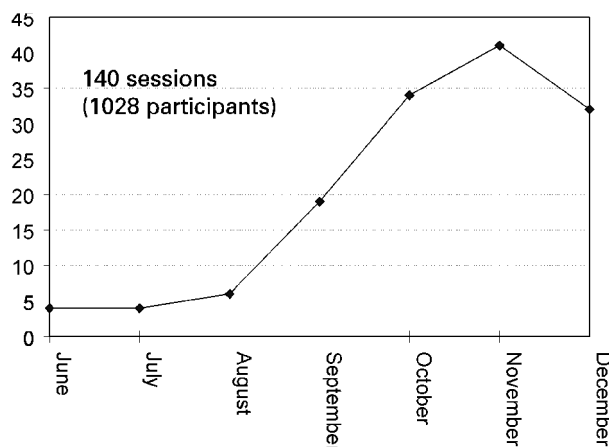


Fig 2 Number of videoconferencing sessions per month following the introduction of ISDN in June 1995.

in 1–33 sessions. The 10 most active institutions represented 82% of the total use.

Of the 1028 participants, 21% were psychologists, 20% were psychiatric nurses and 17% were psychiatrists; other professions (social workers, medical specialists, teachers, primary-care physicians and students), each ranging in participation from 7% to 0.5%, accounted for a further 21%. One per cent (a total of 12) of the participants were patients, while 20% were categorized as 'other'. When there was a large number of participants (e.g. 10–20 persons) users often recorded the number of participants without specifying the profession of each person, thus inflating the 'other' category. We have no evidence that this biased the recorded distribution of professions.

Purposes of use

Fig 3 shows the reasons for videoconferencing. The category 'Meeting' was recorded by 50% of the respondents and included a wide range of activities such as clinical collaboration, research or administration. Twenty-one per cent of the sessions were for training and supervision, 14% for direct clinical work (with and without patient participation), 10% for distance education and 5% for tests or demonstrations.

Alternative form of contact

Fig 4 shows what form of contact would have been used had videoconferencing not been available. In 59% of the sessions one or more of the participants would have travelled for a face-to-face meeting. In 25% of the sessions there would have been no alternative contact at all. The use of the telephone was reported as an alternative in 14%, and post or fax in 2% of the sessions.

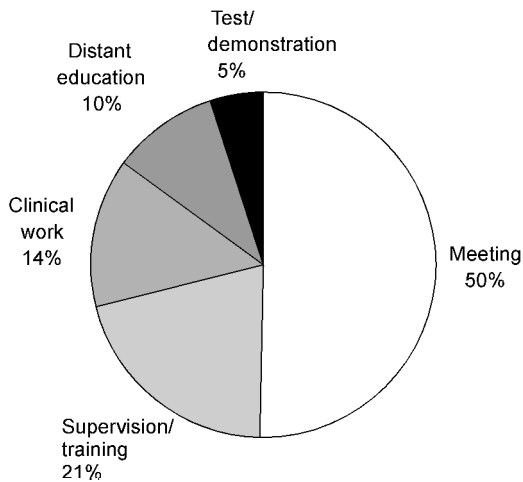


Fig 3 Reasons for videoconferencing.

Transmission speed

The choice of transmission speed for videoconferencing may reflect the users' assessment of cost versus quality. Three of the institutions that returned questionnaires had equipment limited to two ISDN channels (128 kbit/s, the cheapest and lowest quality), and these institutions participated in only one videoconferencing session each. The remaining institutions were able to choose transmission speeds up to 348 kbit/s, with six ISDN channels, which was the most expensive but permitted higher quality. A total of 63% of the sessions used six ISDN channels, 10% two channels, and 8% four channels. The question was unanswered in 19% of the sessions.

Problems

There were no problems reported in 55% of the sessions (Fig 5). Audio problems were reported in 19% and

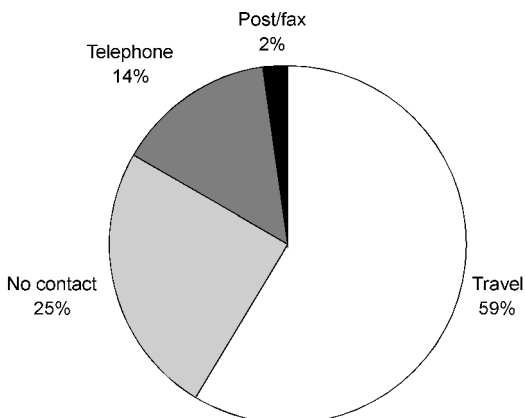


Fig 4 Forms of contact that would have been used had teleconferencing not been available.

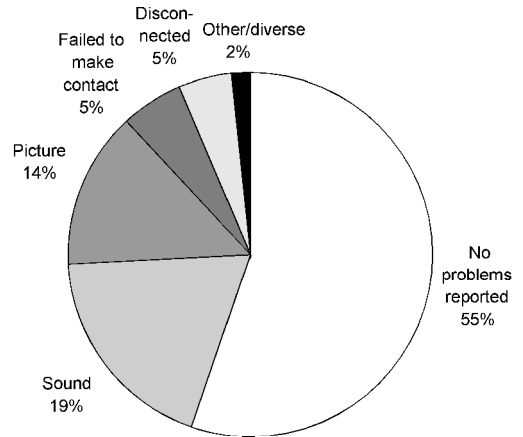


Fig 5 Problems in use.

picture problems in 14%. In 5% of the sessions there was failure to make contact at all, 5% were disconnected and 2% noted other/diverse problems. The categories 'planning/organizational problems' and 'not suitable for purpose' were not used by any of the respondents.

Satisfaction

Fifty-eight per cent of users reported that they were satisfied, 29% were very satisfied, 8% were indifferent or uncertain, 3% were somewhat dissatisfied and 2% were totally dissatisfied, the majority of these because of technical problems (Fig 6).

Discussion

Frequency of use

During six months in 1995, there was a considerable increase in the frequency of videoconferencing in

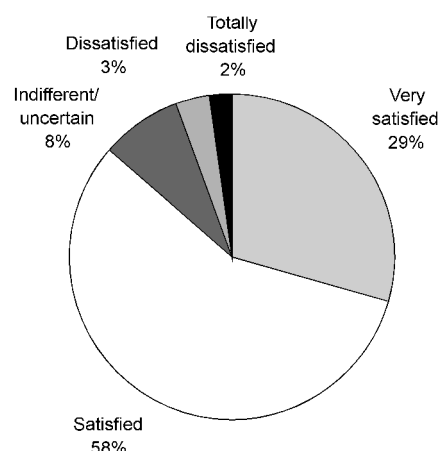


Fig 6 User satisfaction.

mental health care in northern Norway. ISDN, which became operative during this period, provided direct dial-up access and reduced both the hourly charges and set-up costs considerably compared with the operator-administered MegaNet, which was at least 10 times more expensive. We are unable to document the effect of the introduction of ISDN on the volume of use, although we believe that it has increased both investment in studios and the frequency of use of teleconferencing.

Since the questionnaire was introduced at the same time as ISDN, the rate of increase in frequency of use may partly reflect the time it has taken for users to implement routines for questionnaire completion. While it is impossible to differentiate actual use from that reported by questionnaire, it appears safe to claim that the recorded use reflects the minimum. A new billing system will be implemented by the ISDN operator (Telenor) in the future, which will enable us to cross-check questionnaire results with actual use. Continued data collection throughout 1996 will reveal whether the drop in December 1995 (Fig 2) represented a seasonal fluctuation in a steady trend.

The videoconferencing described was freely initiated by the users themselves (not initiated or supported by projects), and the majority of users had little or no previous experience with similar technology. This would suggest that the reported use was not artificially inflated, although initial curiosity during the start-up period may account for some of both the usage and the participants. The general information and support provided by the Department of Telemedicine may also have helped. It is believed that the directory of ISDN numbers provided by the Department for health-care institutions (which includes names and telephone/fax numbers of the contact persons at each institution) has been a simple but effective support factor. We plan to build an Internet-based network for this type of information, as well as a system for booking the studios.

It is our impression that the institutions that failed to inform and/or actively involve clinical personnel in the implementation process were those reporting least use of the equipment. Similarly, those institutions that had positive opinion leaders among clinicians were also those that used the equipment most frequently.

Participation of professionals and patients

Despite the fact that telepsychiatry in northern Norway was initially for clinical work¹, few clinicians have continued this type of use. While the majority of professionals who used videoconferencing were clinicians, only 12 of the sessions (1%) involved either patients alone (e.g. psychiatrist–patient consultation) or patients accompanied by a professional (e.g. psychia-

trist–patient and general practitioner). Although it is difficult to compare our results with other studies because of differing methods, it is interesting to note Brown's⁴ survey of telepsychiatry in the USA, which was based on six of ten identified active telepsychiatry programmes in the USA. Three of the six programmes reported that the proportion of time spent on telepsychiatry was 100% for patient–physician consultations, while only two of the programmes reported physician–physician contact (50% and 5%). The results from northern Norway show that 99% of the sessions were between a wide range of professionals, the most active of whom were psychologists and psychiatric nurses.

Despite differing methods, it is obvious that Norwegian clinicians were less inclined to use videoconferencing for direct patient contact than those included in Brown's survey. We do not have information enabling us to explain why this is so. Although it might be assumed that differing cultural and professional norms play a role, as well as different financing systems (all the institutions involved in our study were wholly publicly financed), further study is needed to illuminate this issue. It is our impression that direct patient contact via videoconferencing will increase in Norway for various reasons, the more important being growing familiarity and acceptance among professionals, better documentation of quality and client satisfaction, and better planning and thoughtfulness in the arrangements for teleconferences with clients.

Purpose of use

The categories used in the survey to describe purpose of use showed the disadvantage of using a questionnaire common to both psychiatry and somatic medicine. We subsequently amalgamated three questionnaire categories which mental health workers found difficult to differentiate: 'Initial consultation/examination', 'Follow-up consultation/control (following discharge)', and 'Clinical consultation'. It is difficult to find equally meaningful categories for both fields and at the same time limit the number of categories. We are trying to remedy this problem in the next version of the questionnaire. Similarly, the category 'Meeting' (used by 50% of the respondents) will be revised in order to differentiate between clinical collaboration, project collaboration, research and administration.

Problems and satisfaction

It is surprising that 87% of users were either satisfied or very satisfied despite the fact that 45% of them reported problems. Since participation was voluntary, it may be assumed that participants were a select group with

positive attitudes and/or real needs. It may be that the satisfaction scores reflected users' expectations of the potential of the technology, as much as they reflected the experiences of the session at hand. Many claim a profound need for improved collaboration with surrounding institutions, and their initial experiences may have convinced them that videoconferencing—despite problems—will contribute significantly. No formal procedures were implemented for assessing patient satisfaction, although plans to do so are under way.

The problem category in the questionnaire did not have an explicit alternative of 'no problem'. We were thus unable to differentiate between those who neglected to answer (missing data) and those who did not in fact experience any problems. The relative contribution of known problems (unplugged units, pinched microphone wires, ISDN instability, inadequate lighting and acoustic conditions, technical configuration, etc.) is unknown. Many of the videoconferencing rooms were used for other purposes, and the units were sometimes unplugged and moved around. Better training of the local support personnel in operating the units, and encouraging institutions to make the necessary adjustments to improve studio conditions, may increase the quality considerably. Telenor, the sole ISDN provider in northern Norway, is making considerable efforts to improve the reliability of the ISDN service.

Cost-effectiveness

Is the use described cost-effective? Fourteen per cent of the sessions, it was reported, could have been carried out over the telephone, and it is fairly simple to calculate the costs of such 'luxury telephone' use. A telephone would use only one ISDN channel, whereas videoconferencing in this study used between two and six. While we believe that the social and occupational benefits of seeing each other are not negligible—particularly for isolated rural clinics—we have no quantitative basis for weighting their relative importance.

The results related to travel do not allow a straightforward assessment of cost-effectiveness. While the results indicate that 59% of the sessions replaced travel, it is unreasonable to assume that 59% of the 1028 participants would have travelled had videoconferencing not been available. For example, it is more likely that the lecturer who delivered a lecture to 20 participants would have travelled, rather than the participants, who, in our study, typically came from the same area.

Thus, an assessment of cost-effectiveness related to travel must be built upon a series of assumptions. Use of

a cost-effectiveness formula developed for teleradiology⁵ indicates that a typical mental health institution in northern Norway would have to save 18 trips per year over a distance of 800 km (e.g. Tromsø to Kirkenes) in order to break even, or 34 trips per year if the distance is 300 km (e.g. Tromsø to Harstad). While some of the use was between locations of greater and lesser distances, these are distances which typify doctors' journeys in northern Norway. The estimate of the number of saved trips necessary to break even is based upon fixed set-up costs of Nkr47,000 for six years and an assumed average of 40 videoconferencing sessions per year for one institution (see also Technology and costs, above). The estimate is further based on two-hour meetings requiring a full day's absence for professionals with hourly wages of Nkr200, including social costs, food Nkr225, aeroplane ticket Nkr2520 (800 km) or fuel Nkr500 (300 km), and Nkr155 in communication costs per hour. While cost-effectiveness clearly depends upon frequency of use and travel distance, it appears safe to predict that telepsychiatry will be cost-effective for many institutions in northern Norway.

Questions raised

In addition to the issues discussed above, the survey results raise a number of interesting questions. What is the saved travel time used for (patients, administration?), and what are the implications for service quality and efficiency? Would the degree of use and satisfaction have been much different had users been limited to 128 kbit/s? What are the characteristics and implications of the contact which 25% of the participants would not otherwise have had? Are there social and occupational benefits, and if so are these great enough to have an impact on the rate of turnover of professionals in rural clinics? Is the pattern of collaboration changing (e.g. centre versus periphery, inter-county, regional), and if so what implications does this have for resource distribution? Is the diffusion of telepsychiatry in northern Norway unique, and if so why?

We will look into some of these questions in parallel to continued monitoring of use. The issue of diffusion raises interesting comparative issues (e.g. professional norms, needs, technology, financing systems) and would need to be examined in collaboration with colleagues in other countries. A simple first step would be to identify a few items of comparative interest and integrate them into existing monitoring procedures. The same form is now used for all telemedicine applications based on videoconferencing (e.g. in dermatology, cardiology, ear-nose-throat medicine), and is used by the majority of the health-care institutions that have videoconferencing units in northern Norway.

Many new users in other parts of Norway are planning to implement the same or similar procedures.

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References

1 Gammon D, Wilhelmsen S. Psychotherapeutic counselling via the tele-network. *Tidsskr Nor Lægeforen* 1995;**115**:348-51

2 Baer L, Cukor P, Jenike MA, Leahy L, O'Laughlen J, Coyle JT. Pilot studies of telemedicine for patients with obsessive-compulsive disorder. *American Journal of Psychiatry* 1995;**152**:1383-5

3 McLaren P, Ball CJ, Summerfield AB, Watson JP, Lipsedge M. An evaluation of the use of interactive television in an acute psychiatric service. *Journal of Telemedicine and Telecare* 1995;**1**:79-85

4 Brown FW. A survey of telepsychiatry in the USA. *Journal of Telemedicine and Telecare* 1995;**1**:19-21

5 Bergmo TS. An economic analysis of teleradiology versus a visiting radiologist service. *Journal of Telemedicine and Telecare* 1996;**2**:136-42

Appendix

Questionnaire for registration of videoconference use in health care. Version 0.1. Department of Telemedicine, University Hospital in Tromsø, Norway.

- Location
- Date
- Start time
- End time
- Department/contact person
- Which institution(s) participated
- We called other party
- Other party called us
- Reserved multipoint conference
- Transmission speed: 128 kbit/s 256 kbit/s 384 kbit/s

Participants (numbers, here/other site)

- Patient/client in studio
- General practitioner
- Physician
- Psychiatrist
- Psychologist
- Nurse
- Social worker
- Social support personnel
- Teacher
- Studio technician
- Other*

Total number of persons:

*If others, specify:

Special field

Somatic, specify (e.g. dermatology, ENT):

Mental health care, specify (e.g. child, adult):

Purpose

- Clinical consultation (+ no. of patients)
- Initial examination (+ no. of patients)
- Follow-up/control (+ no. of patients)
- Training/supervision
- Meeting
- Distant education, single
- Distant education, series
- Other (specify):

Problems

- Failed to make connection
- Disconnected
- Audio problems
- Picture problems
- Organizational/planning problems
- The medium was unsuited to the purpose*
- Other*
- *If unsuited/'other', then specify:

Alternative contact

- I/we would have travelled to other party
- Other party would have travelled to us
- Telephone
- Post/fax
- No contact
- Other (specify):

Satisfaction

- Very satisfied
- Satisfied
- Indifferent/uncertain
- Dissatisfied
- Totally dissatisfied

Comments