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The use of videoconferencing for mental health services in Canada and Finland

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THE USE OF VIDEOCONFERENCING FOR MENTAL HEALTH SERVICES IN CANADA AND FINLAND

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Table of Contents

List of Figures

List of Tables

Foreword

This report includes work undertaken as part of a collaborative project on telemental health (TMH) between the Institute of Health Economics (IHE), Edmonton, and the Finnish Office for Health Technology Assessment, Helsinki (Finohta). The aims of the project were to obtain a description of the current evidence available on the effectiveness and costs of TMH services, to summarize published information on the use of TMH services in routine practice, to obtain information on the use of TMH services in Finland and Canada, and to provide commentary on the implications of the available evidence and usage data for decision makers.

The report includes a review of the utilization of TMH in Finland and Canada, using surveys and administrative data. To provide further context, a review of literature on TMH utilization is also included. A review of the literature on the effectiveness and economic outcomes of TMH is presented in a separate publication.

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Executive summary

The utilization of telemental health (TMH) services in Finland and Canada was reviewed to compare the diffusion of videoconferencing (VC) technology in mental health services in the two countries.

Review of the literature on use of TMH

To provide additional context for the study, a systematic review was undertaken of literature that described the routine use of TMH. Sixteen publications were identified: nine were concerned with the clinical use of VC, four with the clinical application of telephone-based services, and three with the use made of TMH services by health professionals.

Programs described in the papers on VC-based services had low utilization of between 1 and 16 patients per month. There was limited consideration of the relationship of TMH services to the overall context of the healthcare systems that they served.

TMH services in Finland

Data on the use of TMH in Finland were obtained through a survey of facilities that provided and/or received such services in 2005.

Survey responses showed that in Finland, the overall rate of TMH consultations was 4 per 100,000 population. The highest TMH consultation per population ratio, 22 per 100,000, was in Northern Finland (Oulu and Lapland provinces).

Most of the sites used telepsychiatric services for less than 10% of clinical outpatient services. The sites with over 20% utilization of clinical TMH services from all psychiatric consultations were all rural health centres.

TMH services in Canada

Information on use of TMH in Canada was obtained from earlier national surveys of telepsychiatry services and from administrative data for the province of Alberta.

The national surveys found there were 10.7 consultations per 100,000 population in 2001 and 14.7 per 100,000 in 2003. The rate for Alberta had reached 39 per 100,000 by 2005/06.

Comparison of TMH use in the two countries

The higher rates of utilization in Canada, compared with Finland, could be associated with differences between the countries in organization of services and availability of mental healthcare professionals. In both Finland and Canada, TMH consultations are only a very small proportion of all mental health services.

Use of TMH has been particularly significant in areas that are remote from major centres of population. However, in both Finland and Alberta, there are many rural centres that do not utilize clinical TMH.

TMH is widely utilized for continuing and medical education in both countries. Administrative meetings in TMH are also common in all programs.

Abbreviations

AMHB - Alberta Mental Health Board
Finohta - Finnish Office for Health Technology Assessment
ISDN - Integrated Services Digital Network
TMH - telemental health
VC - videoconferencing
VHA - US Veterans Health Administration

Introduction

Telemental health (TMH) includes a wide area of telemedicine activities that covers all the subspecialities of mental health. Telemedicine provides services over a distance, utilizing telecommunication equipment for transmitting voice, images, or data (text, numbers). Telemedicine services for mental health have been provided using videoconferencing (VC), telephone, and the Internet.

Although TMH has been introduced in many countries, there is still little information on the extent to which it is used in routine health services. In this report, we consider the utilization of TMH services in Finland and Canada. The focus of the report is on the use of VC in TMH services, a topic that is of interest to healthcare decision makers. Information on the use of VC is comparatively easy to obtain. Details of telephone-based consultations in TMH are more difficult to find in the absence of suitable registries or databases. Use of the Internet is relatively recent and centralized sources of information on its routine use in TMH do not exist.

The first VC projects on mental health in Finland and in Canada started in the 1990s.[1-3] These, and later projects,[4-7] showed that such services in mental health care were feasible, comparable to conventional care, and potentially cost saving from a societal perspective above a certain level of utilization. The present study considers what has happened since the completion of the earlier projects. The intent is to compare the diffusion of VC technology on mental health in different service and management areas in the two countries. The analysis is descriptive, as there is only limited information on the decision- and policy-making processes that have led to the observed diffusion of VC.

Information on TMH in Finland was obtained through a survey of facilities that provide and/or receive such services. For Canada, we drew on published data from earlier national surveys of telepsychiatry services and on administrative data for the province of Alberta, where TMH services have been established for some years. To provide additional context for the data from Finland and Canada, we also reviewed available literature that described the routine use of TMH.

Methods

Review of TMH utilization

Papers that described aspects of routine use of TMH were identified as part of a broader literature search for papers that reported appropriate clinical, economic, or administrative outcomes used in a review of TMH that is presented in a separate report.[8]

Literature search

Computerized literature searches were performed using the MEDLINE, HealthSTAR, EMBASE, PsycINFO, and CINAHL databases to June 2006. The search strategy is described in Appendix 1. Searches were also made of the ACP Journal Club, the *Cochrane Database of Systematic Reviews*, the Database of Abstracts of Reviews of Effects, and the Controlled Clinical Trials Register.

Selection of publications

The following criteria were used in the selection of publications for the review:

Inclusion criteria

- Articles that included credible information on the extent of use of TMH services in routine practice. All types of TMH application and methods of communication were considered.

Exclusion criteria

- Articles that considered only technical issues.
- Articles in which the information provided was insufficient to establish scientific credibility.
- Articles that duplicated other publications.
- Reviews and general articles, other than for citation in discussing the results of the review.
- Articles concerned with medical and continuing education.

Initial screening of the identified articles was based on the information obtained from their abstracts. All abstracts were read independently by all the authors and the selection of relevant articles agreed upon in discussion. When an abstract did not give sufficiently precise information about the study, or such information was not available at all, the article was obtained for further review.

Full-text articles obtained for closer inspection were evaluated independently by the authors, who then reached a consensus on whether or not an article should be included in the final review, with reference to the selection criteria.

Data were extracted from each selected paper on the location of the TMH service, the subspecialty of the program, the target population and volume, the number of services provided, and the type of communication technology.

Comparison of Finnish and Canadian data on TMH services

To analyze the current utilization and the diffusion of TMH services in Canada and Finland, we used data from surveys and from administrative databases. We included all VC activities in the specialty of mental health that were related to *clinical services*, *education*, and *administrative meetings*. We also analyzed the distribution of the clinical services to child/adolescent, adult, and geriatric clients. Information on forensic TMH services in Alberta was also identified.

Finland

Data on the use of VC for TMH in Finland for the year 2005 were collected in an electronic survey (e-survey) administered by the Finnish Office for Health Technology Assessment (Finohta). The authors developed a questionnaire based on that used in surveys of Canadian telepsychiatry services (Appendix 2).[9] The survey was in Finnish and questions that had been used in the Canadian surveys were modified to correspond to the Finnish healthcare system, taking account of the way that VC activities and telepsychiatry are arranged in Finland. In the development of the questionnaire, we consulted two experts from the field of telepsychiatry and telemedicine.

The survey was developed to be used both in specialized care facilities, which mainly provide services, and in primary care centres, which mainly receive services. Matters covered by the survey are shown in Table 1.

Table 1: Items included in the Finnish survey of TMH services

- Identity of the healthcare organization
- Healthcare district
- Stage of the establishment of the TMH program
- Type of patients
- Number of clinical, educational, and administrative TMH services
- Proportion of clinical TMH services provided by the centre
- Number of participants per educational session
- Number of receiving sites
- Length of TMH sessions

TMH: telemental health

The survey was performed using the webropol Internet online survey instrument (www.webropol.com). It was sent to 21 of the 22 healthcare districts. The Åland Islands Health District was excluded because it is a predominantly Swedish-speaking small district where administration of a Finnish questionnaire would not have been feasible. An e-mail message describing the survey was sent to the chiefs of psychiatry in each healthcare district and to the medical directors of the health centres in Finland. Each chief or medical director was asked to forward it to the person responsible for mental health services or telemedicine services in mental health. A reminder was sent approximately three weeks after the first e-mail request.

Material from the survey responses was downloaded and subsequently analyzed by one of the authors (AO).

Canada

Data for TMH VC services in Canada were taken from the results of three surveys that were sponsored by the Canadian Psychiatry Association Section on Telepsychiatry and conducted by the Alberta Mental Health Board (AMHB) Telemental Health Service.[9-11] The most recent data are for fiscal year 2003/04. In the surveys, questionnaires had been e-mailed to all known established and operational telepsychiatry programs in 10 provinces and three territories across the country.

Questions in the surveys were broadly categorized to cover the following areas: service provision model, clinical services provided, service volume, technology used, additional non-clinical services, funding sources, and barriers to long-term sustainability.

Alberta

Administrative data for VC services in Alberta were obtained from the Alberta VC scheduling system by the AMHB, which is responsible for monitoring TMH services in the province.

The information gathered by AMHB on VC sessions include the type of session (administrative, clinical or clinical case review, education), its subspecialty (telepsychiatry adult or children or geriatric, forensic mental health), whether the site is providing or receiving a session, attendance (how many professionals, patients, and family members participate in the session), expected duration of the session, and use of a bridge connection.

Most of the clinical services are between two sites (a specialist at a mental health facility provides a service to the patient at a hospital or clinic). Estimates of use were based on the number of receiver sites and the overall number of consultations. For educational sessions, we identified the providing sites, the number of separate education sessions, and the number of session participants from Alberta and from other jurisdictions.

The Alberta administrative data were obtained for the financial years 2004/05, 2005/06, and 2006/07 to provide information on the diffusion of TMH services in the province under the provincial scheduling system. Data for earlier years were obtained from published reports of studies undertaken by the AMHB[4,12] and from AMHB records.

Results

Literature review

From 1033 publications identified in the literature search and through references from a separate project, 16 studies or descriptions of the routine use of TMH

services were selected for review of utilization aspects. Details of the individual studies are given in Appendix 3.

Nine papers considered single programs with one hub and one or more satellites, two papers were concerned with multiple centres and satellites within large geographical areas, four papers described programs based on single call centres, and one paper presented a national review of telepsychiatry, covering several programs. The national review has been followed up with two further surveys, which are considered later in this report under the section on TMH in Canada. Four of the papers were from the USA, four from Australia, three from Canada, two from the UK, and one each from Finland, Norway, and Spain.

Seven of the papers reported on established TMH programs and eight on programs that had operated for two years or less. The national review of TMH services included details on both established and developing programs. Ten papers were concerned primarily with programs offering general psychiatric services, five with child or adolescent psychiatry, and one with smoking cessation. Nine papers reported on programs that used VC, five on telephone-based services, and two on services in which both VC and telephone had been used. Ten papers dealt with clinical services only, three with a mix of clinical services and training supervision, and three considered clinical, educational, and administrative use of TMH services.

Seven of the papers made some sort of comparison with non-telemedicine services. Three found that TMH compared favourably with some aspects of alternative approaches to service delivery. Two papers reported that populations served by TMH and non-TMH services were similar and two others reported that such populations differed in some respects. Indications of differing populations came from one of the call centre programs, which was more likely than a clinic to have contact from younger smokers, and from a telepsychiatry study in which TMH patients had greater anxiety than those seen in face-to-face consultations.

There was limited consideration of the relationship of TMH services to the overall context of the healthcare systems that they served. Six papers mentioned aspects of the health system and, other than a comment on the effect of telepsychiatry on referral patterns, none provided information on the use of conventional mental health services.

Details on the clinical use of VC-based TMH services described in nine papers are shown in Table 2. Organizational arrangements and the health systems served varied overall, but, the level of use of TMH for clinical purposes was modest.

Information on the use of established telephone-based services is provided in Table 3. Three of the programs handled large numbers of clients, indicating the usefulness of telephone-based approaches.

Table 2: Clinical use of primarily VC-based TMH services

First author, country	Type of service	Patients per program per month	Consults per program per month
Established services			
Cruz M, 2005, USA[13]	Psychiatry	3.5	18.2
Urness D, 2004, 2005, Canada* [9-11]	Psychiatry		21 (4-73)**
Developing services			
Hockey AD, 2004, Australia[14]	Child psychiatry	2.8	4.7
Kennedy C, 2000, Australia[15]	Psychiatry	1.3	
Mielonen M-L, 1998, Finland[1]	Psychiatry		9.8
Myers KM, 2004, USA[16]	Child psychiatry	8.8	
Simpson J, 2001, Canada[4]	Psychiatry	15.8	22.8
Whitten P, 2004, USA[17]	Psychiatry	11.0	21.0
Zaylor C, 2000, USA[18]	Psychiatry		34.0

*Review of 17 programs

**Range for established provincial telepsychiatry programs

TMH: telemental health; VC: videoconferencing

Table 3: Use of established telephone-based TMH services

First author, country	Type of service	Calls per month
Gilbert H, 2005, UK[19]	Smoking cessation	531
Herreros O, 2002, Spain[20]	Child psychiatry	500-2000
Ledek V, 2002, Australia[21]	Mental health support	1117
Sheerin DF, 1994, UK[22]	Adolescent psychiatry	4

TMH: telemental health

Use of VC for tele-education services was mentioned in three papers. The Canadian review referred to 388 sessions in 13 programs in 2001 (30 sessions per program, range 2 to 105).[9] On average, there were 8.3 sites per session. In the study by Mielonen et al.,[1] 45% of VC time was used for teaching. Two of 28 consultations in the study by Hockey et al.[14] were for education.

Three of the selected papers were concerned with the use made of TMH services by health professionals, rather than with number of services. Gammon et al. (1996)[23] found that types of VC use most frequently identified by health professionals in Northern Norway were training and supervision, clinical consultations, and distance education. In the Australian study by Gelber (2001),[24] 92% of those surveyed had used VC for clinical support and 36% for teaching. The description by Kates et al. (1997)[25] of telephone support for general practices by a psychiatrist noted that 63% of calls were from physicians and the remainder from counsellors.

Other information on routine use of TMH

Other information on routine use of TMH is available from reports and websites. The US Veterans Health Administration (VHA) operates a large TMH network. In 2003, 13,840 TMH encounters were delivered to 8370 veterans from 73 hospitals to 143 satellite clinics and 12 home health programs.[26] In 2004, more than 9700 VHA patients received over 20,000 TMH visits.[27] Treatment areas include medication management, individual psychotherapy, group therapies, substance abuse treatment, and specialty post-traumatic stress disorder programs. VC is used extensively and home TMH programs also use videophones, home messaging devices, and interactive voice response over telephone lines.

Activity within individual programs has been of the same order as that reported in the publications included in our review. A 1998 survey of 19 TMH programs in the US found that they performed an aggregate of about 720 consultations per month (38 per program per month).[28] An earlier survey, in 1994, found that nine US programs performed 948 TMH consultations (nine per program per month), with the most active program, at Norfolk (Nebraska) Regional Medical Center, undertaking 35 per month. Similar findings were reported by Brown (1995),[29] with five programs reporting an average use of six clinical consultations per month.

Over the six years from February 1995, the Appal-Link Network in Virginia, USA, provided TMH services to 853 consumers (14.2 per month), involving 5173 separate activities (86 per month). More than 350 consumers participated in psychotropic medication management clinics.[30]

The telepsychiatry program in South Australia undertook 2219 clinically related sessions from May 1994 to February 1998 (49 per month), of which 1947 directly involved patient assessments.[31]

Survey of TMH in Finland

The Finnish survey reviewed the utilization of TMH health services in 2005. We obtained responses from 85 primary care centres and eight other clinics from 20 health districts, a response rate of 37%. There were also responses from 43 specialized care facilities in mental health from 19 districts. Twenty-eight of these facilities were central hospital clinics, seven were from regional hospitals, and eight were clinics at three university hospitals. In total, 135 units responded to at least some of the survey questions. Two health centres did not answer questions about TMH utilization (Table 4).

Responses on utilization of TMH services in 2005 are shown in Table 4. Of the 135 units that answered the question, 43.7% had not used telemedicine or telepsychiatry, 14.1% were planning to use it, 23.7% had tested it, and 18.5% had it in routine use.

Of all responding hospital units, 77% had either tested TMH or had it in routine use, whereas the majority (76%) of primary care centres had not used it at all nor had plans to use it.

Table 4: Utilization of clinical, educational, and mentoring TMH services in Finland by type of healthcare unit

	Degree of TMH utilization				
Type of unit	Not at all	Planned but not tested	Tested but not in routine use*	In routine use*	Total
Regional hospital	1	1	1	4	7
Central hospital	1	4	14	9	28
University hospital clinic	1	2	3	2	8
Primary care centre	53	11	12	8	84**
Other clinic	3	1	2	2	8
Total	59	19	32	25	135**

*Routine use means that the service is no longer a pilot and it has a list price that users will pay.

**Two missing values for primary care centres were excluded from the table.

TMH: telemental health

Fifty-three units (39% of responders) said that they had either received or provided telepsychiatric services (Table 5). Of these units, three (6%) had only provided services, 28 (53%) had only received services, and 22 (41%) had both received and provided services.

Fifteen of the hospital level clinics had both provided and received TMH services, 15 had only received TMH services, and one had only provided them. Primary healthcare centres that utilized TMH were primarily receiving sites (65%).

Of the 57 units that had tested or used TMH services (Table 4), 45% did not have any patient consultations by TMH in 2005. A big majority of those units had used TMH for other mental health services such as education. The majority (85%) of clinical TMH services were provided by six clinics that gave from 7 to 60 consultations per year.

Table 5: Distribution of active TMH units to receiving and providing sites

	Type of TMH utilization*			
Type of unit	Both received and provided TMH services	Only provided TMH services	Only received TMH services	Total
Regional hospital	2	0	2	4
Central hospital	10	0	13	23
University hospital clinic	3	1	0	4
Primary care centre	5	1	11	17
Other clinic	2	1	2	5
Total	22	3	28	53

*Only 32 units (60%) had patient consultations in 2005.

TMH: telemental health

Of the 53 active TMH sites, only 32 had clinical consultations during 2005. The majority of these clinics (60%) had given services to both new patients and to those who had previous consultations or were inpatients. One unit had provided services mainly to first-visit patients and three mainly to patients who had previously used conventional mental health services.

Four of the health districts had no TMH site providing clinical consultations, eight had one site, and six had two sites providing or receiving clinical TMH services. The biggest utilizers of the clinical services were Lapland (four sites) and Northern Ostrobothnia (eight sites), regions that are located in the north of Finland (see map in Appendix 4).

Number of consultations

In the Northern Ostrobothnia Health District, the biggest TMH site was Oulu University Hospital, which includes two TMH clinics, an adult psychiatric clinic with 56 provided (and 14 received) teleconsultations, and a child and adolescent psychiatric clinic that provided an additional 34 visits. The other major provider was Kainuu Hospital District, which provided 60 consultations in two clinics. The total number of TMH clinical consultations was 200.

On the basis of the data in the survey, the overall rate of TMH consultations in Finland was about 4 per 100,000 population. The highest TMH consultation per population ratio, 22 per 100,000, was in Northern Finland (Oulu and Lapland provinces). In other areas, the population ratios were zero or very small.

From the 21 units that gave information about subspecialities, 14 provided child and adolescent services (42% of all consultations) and 14 provided general adult psychiatry services (55% of all consultations). Only two sites had VC services for persons with addictions (3%), one provided geriatric services, and one dealt with adolescent eating disorders.

The length of the clinical consultations varied substantially, but the median and most dominant interval was 31 to 60 minutes per clinical consultation.

From 15 hospitals that provided clinical TMH services, most had between 1 and 3 clinics providing services. Most of the providing hospitals also offered services to fewer than four sites. Two hospitals provided services to 10 sites and the biggest provider, the Oulu University Hospital, provided services to 20 sites.

Proportion of outpatient consultations

From the sites that used TMH routinely or had tested it, 37 answered the question about the percentage of usage of TMH for outpatient consultations (Table 6). Most of the sites used telepsychiatric services for less than 10% of clinical outpatient services. The sites with over 20% utilization of clinical TMH services from all psychiatric consultations were all rural health centres.

Table 6: Proportion of outpatients seen using videoconferencing in active TMH sites

	Percentage of outpatients seen by VC					
Type of use	<10%	21%-30%	31%-40%	61%-70%	91%-100%	Total
In test use	21	0	1	0	0	22
In routine use	12	1	0	1	1	15
Total	33	1	1	1	1	37

TMH: telemental health; VC: videoconferencing

Healthcare providers

Of 21 sites that provided services to other sites, 95% used psychiatrists to deliver clinical services. Other providing healthcare professionals were nurses (48% of sites), psychologists (33%), and other medical doctors (24%). At 91% of the sites, it was expected that the patient would be accompanied by a healthcare professional during the video consultation.

Mentoring

A total of 335 VC sessions received or provided professional mentoring or other equivalent supervision (about half were received sessions). Fifty units that responded to professional mentorship program questions indicated that 90% of them used it for between 0% and 10% of both provided and received mentoring activities. Only two sites received more than 10% of their mentorship services via VC.

Educational sessions

A total of 67 sites answered the question about TMH education. Details on number of sessions by type of centre are shown in Table 7. Eighteen of those sites (27%), most of them health centres, had no tele-education during the year. The mean number of sessions by participating site was 39.6 and the median was six. There was a median of two tele-education sites per region. Four health regions had no TMH education sites and the most active regions were Northern Ostrobothnia (seven sites), Vaasa (five sites), and Lapland (five sites) in Northern and Western Finland. There were TMH education activities throughout the country, with the exception of some areas in South Central Finland. Educational activities in mental health were mainly provided by two university hospital clinics and two mental health hospitals.

There were 889 educational sessions, with an average of two receiver sites per session. Most receiver sites had 3 to 5 people per session. The four main provider sites used VC for 21% to 30% of all provided education. Thirty-one of the 63 sites that received continuing education had received up to 10% of sessions via telemedicine. Eleven sites received 11% to 20%, nine sites received 21% to 30%, and four sites received over 50% of continuing education via telemedicine.

Table 7: Number of received and provided educational sessions by type of organization

# Sessions	Regional hospital	Central hospital	Other clinic	Health centre	University hospital	Total
0	0	4	1	13	0	18
1-5	1	4	1	8	1	15
5-10	1	2	0	2	0	5
11-25	1	0	0	0	1	2
26-35	2	6	1	2	0	11
36-50	0	7	0	0	2	9
51-85	1	2	2	0	0	5
700	0	1	0	0	1	2
Total	6	26	5	25	5	67

Administrative meetings

There were 112 administrative meetings in mental health using VC in 2005, involving 22 sites and 11 regions. The most frequent user of the administrative meetings was Northern Ostrobothnia Health District with six sites, followed by Central Finland with four sites. The nine other regions had only one or two sites participating in administrative TMH meetings.

Expected changes in TMH services

The e-survey also asked about the expected change in use of TMH services during the next 3 years. Table 8 shows that close to 60% of the units that responded to that question estimated that three main utilization areas of telemedicine in mental health in Finland would increase in the future. The rest of the units predicted that the telemedicine activities would remain unchanged. Only one unit estimated that the number of clinical consultations would decrease.

Table 8: Expected change in TMH services during the next three years

Type of service	Increase	Unchanged	Decrease
Clinical consultations	43 (58.1%)	30 (40.5%)	1 (1.4%)
Mentoring via VC	39 (54.9%)	32 (45.1%)	0
Education via VC	49 (62.8%)	29 (37.2%)	0

TMH: telemental health; VC: videoconferencing

Telepsychiatry in Canada

The three surveys of telepsychiatry services in Canada undertaken in 2001, 2002, and 2003 focused on VC activities, although a few Canadian telepsychiatry programs also use telephone or videophone to deliver some of their services.[9-11] Not all the telepsychiatry programs in the first survey provided responses in the subsequent years, and there was one program that made its initial response in 2003.

In the 2001 survey, 14 active telepsychiatry programs in all 10 Canadian provinces and two of the three territories were identified. The number of VC sites for each telepsychiatry service are shown in Table 9. Of these sites, 55 delivered and 185 received telepsychiatry services. The total number of sites that could potentially have received telepsychiatry services was 362, indicating that between 51% and 66% of all sites were active in 2001. The large majority (94%) of inactive potential sites were in Newfoundland and Alberta.[9]

Table 9: Active telepsychiatry program sites in Canada, 2001

Jurisdiction	Delivery sites	Receiving sites
Yukon	1	5
Northwest Territories	1	1
British Columbia	1	5
Alberta	10	37
Saskatchewan	1	8
Manitoba	3	11
Ontario/North	15	63
Ontario/Outreach	8	20
Ontario/U of Toronto	6	15
Quebec	1	9
New Brunswick	2	3
Newfoundland	3	5
Nova Scotia	1	2
Prince Edward Island	2	1

U of Toronto: University of Toronto

The number of consultations undertaken are shown in Table 10. In 2001, 13 programs undertook 3339 teleconsultations, of which 59% were provided to adults, 36% to children and adolescents, and 5% to geriatric patients. Rates of teleconsultations were 10.7 per 100,000 population overall and 19.4 per 100,000 population for children and adolescents. The median number of consultations per delivery site in 2001 was 56.

In 2003, the number of consultations was 14.7 per 100,000 population in all provinces, based on responses from 10 programs, an increase of 37% in telepsychiatry consultations over the 2 years. Comparison of the programs that provided responses in both 2001 and 2003 shows an increase of 73%, though experience in individual programs varied: five increased their activities, three decreased them, and two made negligible use of telepsychiatry.

The programs in Yukon, Northwest Territories, and Prince Edward Island had relatively low utilization that was slightly decreasing during the period. Two of three comparable programs in Ontario and Nova Scotia had substantially increased consultations, whereas one Ontario program had decreased consultations (Table 10). Alberta, the second largest program, had slightly increased activity during the period.

Table 10: Clinical consultations in telepsychiatric programs in Canada between 2001 and 2003

Province/territory	2001	2002	2003	Consultations per delivery site in 2001
Yukon	120	89	62	120
Northwest Territories	9	5	4	9
British Columbia	176	50	-	176
Alberta	786	836	985	79
Saskatchewan	53	75	-	53
Manitoba	<5	-	845	N/A
Ontario/North	290	451	1456	19
Ontario/Outreach	872	-	103	109
Ontario/University of Toronto	333	604	638	56
Ontario/CareConnect	-	-	173	-
Quebec	5	30	-	5
New Brunswick	73	60	-	37
Newfoundland	442	115	-	147

Table 10: Clinical consultations in telepsychiatric programs in Canada between 2001 and 2003 (continued)

Province/territory	2001	2002	2003	Consultations per delivery site in 2001
Nova Scotia	130	109	394	130
Prince Edward Island	50	-	6	25
Total (2001 and 2003) *	3339 (2590)	2424	4666 (4493)	Median: 56

*Totals for programs that were in both 2001 and 2003 surveys

In 2001, 13 programs had 388 educational sessions, with a median of seven sites participating in each educational session.[9] In 2003, 10 programs offered from 3 to 633 educational sessions, with participating sites ranging from 3 to 20.

Administrative-related sessions were provided by 82% of programs and ranged from 14 to 409 sessions, with participating sites ranging from two to four sites.

In addition, six programs offered patient and family visits for 1 to 173 family visits during 2003.

TMH services in Alberta

Number of services

Table 11 shows the number of clinical TMH consultations for Alberta by year, including those for the initial pilot project. There has been a steady increase in the number of services, mainly for telepsychiatry, over the period. This growth in services has been associated with an increase in the number of receiver sites, from five at the start of the program to 83 in 2006. Some sites are co-located (for example, in different rooms in the same building). There were 68 locations for receiver sites in 2006, distributed among all nine provincial health regions.

Table 11: Total clinical TMH consultations for Alberta

	1996 /97 (pilot)	1997 /98	1998 /99	1999 /00	2000 /01	2001 /02	2002 /03	2003 /04	2004 /05	2005 /06	2006 /07
Number of services	148	263	320	484	702	807	836	985	1020	1266	1512

TMH: telemental health

Table 12 shows the number of clinical TMH services in Alberta for the most recent three financial years. The proportions of services for adults, children, and geriatric clients are similar to those found in the Canadian telepsychiatry surveys. The recent increase in child psychiatry services is striking. The number of hours of VC in the 3 years was 4433, with an average session duration of 1 hour 10 minutes. At least one clinical TMH service was received in 61 sites in eight of the nine health regions during the 3 year period.

Table 12: Number of clinical TMH services in Alberta 2004/05 to 2006/07

Service area	2004/05	2005/06	2006/07	Total	Percentage of all services
Telepsychiatry - adult	806	898	1094	2798	73.5
Telepsychiatry - children	137	283	321	741	19.5
Telepsychiatry - geriatric	55	57	50	162	4.2
Other TMH services	32	28	47	107	2.8
Total	1030	1266	1512	3808	100

TMH: telemental health

The number of forensic TMH services during the 3 years are shown in Table 13. Of the total of 556 forensic services, 58% were individual therapy sessions, 32% were psychiatric or psychological consultations, 7% were assessments, and 3% were other consultations. The total duration of the VC sessions was 525 hours, and during the 3 year period, 57 sites received at least one forensic session. Forensic services accounted for 13.2% of all TMH services in Alberta during this period.

Table 13: Number of forensic TMH services in Alberta

	2004/05	2005/06	2006/07
Forensic TMH services	253	148	178

TMH: telemental health

Distribution of clinical services

Geographical distribution of TMH consultations for the nine health regions in Alberta is shown in Figure 1. The major centres of population are Edmonton and Calgary.

Table 14 shows the distribution of the consultations via VC in the nine health regions. The low numbers in the Capital Health and Calgary regions, which include Edmonton and Calgary, are expected because of easy access to conventional mental health services for most residents. The Aspen, David Thompson, and Peace Country regions have the highest absolute number of TMH clinical consultations and also the highest consultation rates per 100,000 population. Aspen and Peace Country are geographically large rural regions with few specialist services in mental health. The David Thompson region, which is also large and mostly rural, includes Alberta's third most populous city and a large mental health hospital.

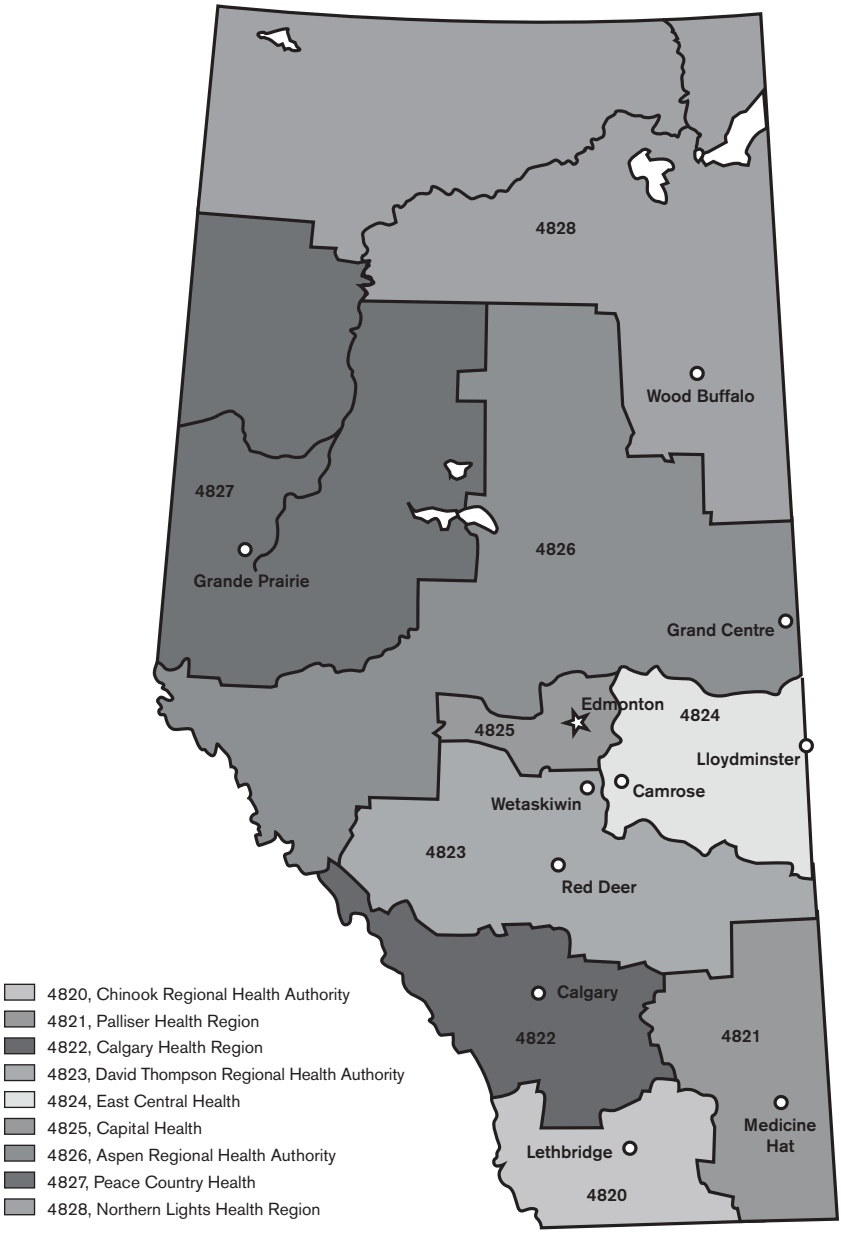
Table 14: TMH consultations in nine health regions, 2005/06*

Region	Population	Clinical TMH	Forensic TMH	TMH clinical consults/ 100,000
Chinook	154,900	2	5	1.3
Palliser	100,970	0	-	-
Calgary	1,171,200	10	11	0.4
David Thompson	293,829	392	11	133
East Central	110,476	18	10	30
Capital Health	1,005,348	5	11	0.5
Aspen	176,352	637	57	353
Peace Country	135,237	174	16	129
Northern Lights	73,673	28	27	38
Total	3,222,185	1266	148	39

*Includes consultations from Child and Family Services Authorities and First Nations Inuit Health Branch

TMH: telemental health

Figure 1: Health Regions in Alberta, 2005



Source: Statistics Canada

Table 15 shows the number of consultations at the five sites that were the first in the Alberta program and illustrates the varying experiences in different communities. Services at Drayton Valley and Edson have grown steadily, and those of Drumheller have also grown but have plateaued in recent years. Services at Wetaskiwin have remained on a relatively low level, perhaps because of proximity to the mental health hospital at Ponoka. Use of TMH at Wainwright continued to be modest, as at other sites in the East Central region.

In addition to the three successful telemedicine pilot sites (Table 15) in Aspen and David Thompson, more recently established sites have strengthened the role of TMH in these regions. In Aspen, busy sites include Whitecourt and Jasper that, like Edson, are located in the west, as well as Slave Lake in the northern part of the region, with no major city within 250 kilometres. In Aspen, all sites that were major users of telemedicine services were from the western part of the region. There has been recent strong growth in use of TMH within the northern Peace Country region, with the number of clinical consultations increasing from 75 in 2004/05 to 293 in to 2006/07. With the Exception of Hanna in the David Thompson region, there are no big TMH users in the eastern part of Alberta.

Utilization of TMH is negligible in the southern regions of Palliser and Chinook, though many of communities there are at significant distances from centres of expertise. This lack of VC use for TMH may in part reflect reluctance to change from traditional patterns of referral. It was recognized at the start of the Alberta TMH program that important factors in site selection include not only the distance from major centres, but also the attitude of the community towards innovation, assessment of mental health needs, and efforts by the communities to achieve equitable resource allocation.[2]

Table 15: TMH use by the original sites in the program

		Number of consultations					
Site	Region	1996/97 (pilot)	1997/98	1998/99	2004/05	2005/06	2006/07
Drayton Valley	David Thompson	17	31	65	168	160	197
Drumheller	David Thompson	53	84	99	85	109	112
Edson	Aspen	53	127	102	236	253	204
Wetaskiwin	David Thompson	15	12	6	13	33	27
Wainwright	East Central	9	9	11	1	5	8

TMH: telemental health

Comparison of TMH with other mental health services

Information from the AMHB indicates how TMH in the province relates to other mental healthcare services. Tables 16 and 17 compare TMH with conventional mental health services for the seven rural health regions. The Capital Health and Calgary regions are not included because there is easy access to conventional mental health services for their patients and TMH is of less significance. Dropping those two regions raises the TMH clinical consultations per 100,000 population to 119 for the rural regions.

Table 16 compares TMH services per 100,000 with individuals served by community mental health clinics per 100,000. In the Aspen region, TMH was used in over 14% of clinic visits in 2005/06. David Thompson and Peace Country both had over 7% of clinic visits that used TMH and, in the following year, the proportion for Peace Country had risen to 14.8%. The proportions of TMH services in the remaining rural regions were substantially lower.

Table 16: Proportion of mental health clinic visits by TMH in rural health regions

Region	Individuals served by community mental health clinics, per 100,000[32*]	TMH consultations per 100,000 (2005/06)	Percentage of clinic visits using TMH
Northern Lights	1615	38	2.4
Peace Country	1700	129	7.6
Aspen	2507	353	14.1
East Central	2145	30	1.4
David Thompson	1689	133	7.9
Palliser	2413	0	-
Chinook	1710	1.3	0.1

*Source: Alberta Mental Health Board, 2004, cited in reference 32

TMH: telemental health

A further perspective is obtained from comparing rates of TMH services with those for all outpatient visits for mental health services (Table 17). For the whole of Alberta, the TMH consultations accounted for 0.13% of all mental health outpatient visits.

Table 17: TMH consultations and total outpatient visits in rural health regions

Region	Total outpatient visits/100,000, 2004/05*	TMH clinical consults/ 100,000 (2005/06)
Chinook	15,087	1.3
Palliser	60,789	-
David Thompson	23,477	133
East Central	28,557	30
Aspen	30,127	353
Peace Country	24,397	129
Northern Lights	43,146	38
All rural regions	29,001	119

*Includes community mental health clinic visits and clinic outpatient visits. Family physicians, private services not included. Source: Alberta Mental Health Board, utilization statistics, personal communication, Mel Slomp, June 2007.

TMH: telemental health

Educational services

TMH has been utilized widely in providing continuing and medical education. The AMHB provided 82 sessions in 2004/05 and 86 in 2005/06 to sites in Alberta and several other jurisdictions (Table 18). The number of participants in these events in Alberta were 3066 and 3059 in 2004/05 and 2005/06, respectively. There were 846 and 939 participants in other jurisdictions. The most popular topic areas were brain injury, forensic education, general mental health, and Aboriginal mental health (Table 18).

Table 18: Continuing and medical education in TMH for 2004/05 and 2005/06*

Type of session	Participating provinces and territories	2004/05		2005/06	
		# Events	# Participants	# Events	# Participants
Aboriginal MH series	Alberta	4	253	8	463
	BC, Sask.				12
Brain injury series	Alberta	30	1131	27	965
	BC, Nun., NWT, Sask., YT		340		501
Family therapy series	Alberta			12	193
Forensic education	Alberta	24	1090	19	749
Series	BC, Man., NB, Nun., NWT, Sask., YT		326		370
MH-general	Alberta	7	236	10	295
	BC, Man., Nun., NWT, Sask.,		31		56
Other continuing	Alberta	17	379	10	394
Learning	BC, Nun., NWT, Sask.,		149		0
Total	Alberta	82	3089	86	3059
	Other jurisdictions		846		939

* TMH education includes only activities that are organized by the Alberta Mental Health Board.

BC: British Columbia; Man.: Manitoba; MH: mental health; NB: New Brunswick; Nun.: Nunavut; NWT: Northwest Territories; Sask.: Saskatchewan; YT: Yukon Territory

Administrative use

According to 2003 statistics for total VC utilization, about 34% of VC activities (providing and receiving sites) in Alberta were for administrative purposes.[33] In the provincial telehealth scheduling system, there is no good way to determine the medical specialties that are involved with the VC sessions; therefore, recent information on administrative meetings from the specialty of mental health is not available. Results from an earlier study indicated that the proportion of VC sessions in the TMH service used for administrative meetings increased from 7% in the first two years of routine operation to 27% in 2001/02.[12]

Discussion

This report has provided data on the extent of use of TMH services in Finland and Canada. Many countries started substantial projects in TMH in the 1990s, but little is known about how the telehealth delivery systems have diffused and substituted or enhanced conventional mental health services.

Our review of the literature indicates that there are still few publications that describe the utilization of TMH in routine health care. Except for some Canadian programs, which are discussed separately in this report, the TMH programs in our review that used VC offered clinical services to relatively small patient populations and had low utilization with few client sites. Some telephone-based programs had higher utilization. No national TMH utilization reviews were found other than the Canadian surveys. The papers in our review gave limited consideration to the healthcare systems in which TMH was provided and to the use of conventional mental health services. Since the conclusion of our review, a paper has been published on a survey of VC in Norwegian mental health care. Fifty-one of 113 institutions had used VC in the previous year, mostly for meetings, supervision, and lectures and to a lesser degree for clinical work. The authors conclude that there is a gap between the potential of VC and its actual utilization in Norway's mental health sector.[34]

The development of telemedicine programs in mental health started at about the same time in Finland and in some Canadian provinces. However, the pattern of technology diffusion has not been the same. In Finland, the number of clinical TMH consultations is much lower than the average for several Canadian provinces. In Alberta, the number of patients per population receiving teleconsultations is about 10 times higher than that in Finland and more than twice the Canadian average in 2003. Although Canada and Alberta have had a steadily increasing pattern in clinical consultations, the growth of services in Finland has been very slow and has mainly been due to one major TMH centre in Oulu University Hospital.

Possible factors influencing the different diffusion patterns in the two countries include organization of the healthcare systems, human resources, and technology-related issues. The distances between provider and receiver sites are comparable in the two countries and seem unlikely to have a major impact on the different consultation patterns in telemedicine.

In Finland, the mental health system was integrated into hospital districts in the early 1990s. The districts were left to organize TMH services with the cooperation of about 350 municipalities. Only a few hospital districts started to actively develop TMH services. Our findings are consistent with those of a recent survey of VC in child and adolescent psychiatry in Finland. Use of

VC was reported by 16 of the 21 hospital districts. It had been used for clinical work in 12 districts and for distance education in another 12. VC was used weekly for clinical work and supervision by two districts and for education by three. The authors conclude that although service providers' experiences of and attitudes towards VC were favourable, it has not been widely used in child and adolescent psychiatry.[35]

In Canada, several TMH programs have been organized on a province-wide basis or have large client bases, as is the case for TMH programs in Ontario. In Alberta, the AMHB took a leading role in the development of TMH services and was responsible for providing most TMH clinical consultations from its major mental health facility at Alberta Hospital Ponoka (now the Centennial Centre for Mental Health and Brain Injury). The AMHB also developed a web-based scheduling system that has now been adopted by the Provincial Telehealth Network.

The availability of human resources in mental health might also have something to do with the different diffusion patterns of TMH. Most Finnish municipalities have mental health clinics integrated into their primary care centre system. Finland has about twice as many psychiatrists and psychologists as Canada. Also, there are about four times more mental health nurses than in Canada, many of them working in the mental health and social service areas in primary care.[36] It is possible that the need for TMH consultations is different in these countries.

It seems unlikely that technical issues have had an influence on the different patterns of diffusion. Finland has had an Integrated Services Digital Network (ISDN) to most municipalities for almost a decade, and there are dedicated regional healthcare information networks in place for most of the country. The number of VC units has also increased rapidly in both primary and secondary care. Although the establishment of VC sites in Canada seems to have followed a similar pattern, there have been differences in transmission technology. ISDN lines were not available in remote regions of Canada a few years ago, and satellite phones, SW56 lines, and low-bandwidth IP lines were used in several areas. Availability of high-speed Internet connections that allow high-quality video transmission is a more recent development. Technological change should have favoured Finland, but is not matched by the level of TMH use in that country.

The regional differences in TMH use shown by the Finnish and Alberta data are of interest. The largest TMH program, at Oulu University Hospital, provides services to the whole of Northern Finland, especially through continuing education and mentoring sessions. In 2005, the program provided about half

of all TMH consultations in Finland and that proportion might increase following a recent update in program facilities. In Alberta, the hospital at Ponoka has been a major TMH provider, but there is also substantial provision of services from Edmonton and Calgary, so that there is less dominance by a single program than is the case in Finland.

The data from Alberta and Finland show considerable variation in the diffusion of TMH in different geographical areas. In both health systems, use of TMH has been particularly significant in areas that are remote from major centres of population. However, in both Finland and Alberta, there are many rural areas that do not utilize clinical TMH. It seems that the initiation and maintenance of successful telemedicine activity requires local champions to lead programs and encourage healthcare professionals to use TMH in their daily practice.[37] In both health systems, use of TMH is very low in large urban areas.

Although the level of clinical activity in Canada and Finland differs significantly, TMH in continuing and medical education is widely utilized in both countries. Also, administrative meetings in TMH are common in all programs.

Limitations of the review

The details in this report provide an overview of TMH use in Finland and Canada, but limitations to our analysis should be considered. In Finland, TMH services are offered by several providers and there is no centralized scheduling system. Although the electronic questionnaire was sent to all primary care centres, general and specialized mental health hospitals, and healthcare districts, it is likely that we have missed some users of the TMH services and that some of the data are not fully accurate. Also, not all the returned surveys were completed in full. However, comparison of the survey scope and responses to details of earlier Finnish studies on telemedicine[38] showed that our study captured most sites that are likely to utilize TMH.

The overview of TMH in Canada is based on surveys and the reliability of the data is not known. The surveys probably identified all significant providers of TMH services. However, responses to some survey questions were not provided by all programs. Also, data were not available for some programs for all three years that the surveys were undertaken. The data reliability for TMH in Alberta is thought to be good, as utilization can be tracked directly from the province's electronic scheduling system.

Appendix A: Literature search strategy

Table A.1: Literature search strategy

Database and Edition	#	Search Terms
Ovid MEDLINE 1966 to May Week 5 2006	1	exp MENTAL HEALING/ or exp MENTAL DISORDERS/ or exp COMMUNITY MENTAL HEALTH SERVICES/ or exp MENTAL HEALTH/ or exp MENTAL HEALTH SERVICES/ or mental$.mp. or exp MENTAL FATIGUE/
	2	exp Mental Competency/
	3	mental health.mp.
	4	Psychiatr$.mp
	5	psycholog$.mp.
	6	exp Psychology, Clinical/ or psychodiagnosis$.mp.
	7	or/1-6
	8	(teletherapy or teletherapies).mp.
	9	telepsychiatry.mp.
	10	telepsychology.mp.
	11	remote access to information.mp.
	12	(remote and (monitor$ or consult$)).mp.
	13	Satellite communication$.mp. or exp Satellite Communications/
	14	(teleconference or teleconferences or teleconferencing).mp.
	15	videoconference or videoconferencing or videoconferences).mp.
	16	telemedicine.mp. or exp TELEMEDICINE/
	17	exp Remote Consultation/ or remote consultation.mp.
	18	online health.mp
	19	on-line health.mp
	20	Telehealth.mp.
	21	tele-health.mp.
	22	(e-health or ehealth).mp.
	23	(telecare or tele-care).mp.
	24	(telepsychiatry or tele-psychiatry).mp.
	25	(telemental health or tele-mental health).mp.
	26	or/8-25
	27	7 and 26
	28	limit 27 to (Danish or English or Finnish or French or German or Icelandic or Norwegian or Spanish or Swedish)

Table A.1: Literature search strategy (continued)

Database and Edition	#	Search Terms
Ovid HealthSTAR 1966 to April 2006	1	exp MENTAL HEALING/ or exp MENTAL DISORDERS/ or exp COMMUNITY MENTAL HEALTH SERVICES/ or exp MENTAL HEALTH/ or exp MENTAL HEALTH SERVICES/ or mental$.mp. or exp MENTAL FATIGUE/
	2	exp Mental Competency/
	3	mental health.mp.
	4	Psychiatr$.mp.
	5	psycholog$.mp.
	6	exp Psychology, Clinical/ or psychodiagnosis$.mp.
	7	or/1-6
	8	(teletherapy or teletherapies).mp.
	9	telepsychiatry.mp.
	10	telepsychology.mp
	11	remote access to information.mp.
	12	(remote and (monitor$ or consult$)).mp
	13	Satellite communication$.mp. or exp Satellite Communications/
	14	teleconference or teleconferences or teleconferencing).mp.
	15	(videoconference or videoconferencing or videoconferences).mp
	16	telemedicine.mp. or exp TELEMEDICINE/
	17	exp Remote Consultation/ or remote consultation.mp.
	18	online health.mp.
	19	on-line health.mp.
	20	Telehealth.mp.
	21	tele-health.mp.
	22	(e-health or ehealth).mp.
	23	(telecare or tele-care).mp.
	24	(telepsychiatry or tele-psychiatry).mp.
	25	(telemental health or tele-mental health).mp.
	26	or/8-25
	27	7 and 26
	28	limit 27 to (Danish or English or Finnish or French or German or Icelandic or Norwegian or Spanish or Swedish)

Table A.1: Literature search strategy (continued)

Database and Edition	#	Search Terms
PsycINFO 1972 to June Week 1 2006	1	exp MENTAL DISORDERS/ or exp COMMUNITY MENTAL HEALTH SERVICES/ or exp CHRONIC MENTAL ILLNESS/ or exp MENTAL HEALTH SERVICES/ or exp MENTAL HEALTH/ or exp COMMUNITY MENTAL HEALTH/ or exp MENTAL HEALTH PROGRAMS/ or exp MENTAL HEALTH PROGRAM EVALUATION/
	2	mental health.mp.
	3	exp PSYCHIATRY/
	4	exp PSYCHIATRIC HOSPITAL PROGRAMS/ or exp PSYCHIATRIC EVALUATION/ or exp PSYCHIATRIC PATIENTS/
	5	exp CLINICAL PSYCHOLOGY/ or exp PSYCHOLOGY/
	6	exp PSYCHODIAGNOSIS/
	7	or/1-6
	8	teletherapy.mp. or exp Online Therapy/
	9	telepsychiatry.mp
	10	telepsychology.mp
	11	exp TELECOMMUNICATIONS MEDIA/ or telecommunication$.mp
	12	(remote and (consult$ or monitor$)).mp.
	13	(videoconference$ or videoconferencing).mp.
	14	telemedicine.mp. or exp TELEMEDICINE/
	15	(on-line health or online health).mp.
	16	16 (telehealth or tele-health).mp
	17	(ehealth or e-health).mp.
	18	(telecare or tele-care).mp.
	19	telepsychiatry.mp.
	20	exp TELECONFERENCING/
	21	(telemental health or tele-mental health).mp.
	22	or/8-21
	23	7 and 22
	24	limit 23 to (Danish or English or Finnish or French or German or Norwegian or Spanish or Swedish)

Table A.1: Literature search strategy (continued)

Database and Edition	#	Search Terms
EMBASE 1988 to 2006 Week 23	1	exp MENTAL PATIENT/ or exp COMMUNITY MENTAL HEALTH/ or exp MENTAL STRESS/ or exp MENTAL HEALTH CARE/ or exp MENTAL DISEASE/ or mental$.mp. or exp MENTAL HEALTH/ or exp MENTAL HEALTH SERVICE/
	2	mental health.mp.
	3	exp Psychosis/ or psychiatr$.mp
	4	psycholog$.mp
	5	psychodiagnosis.mp. or exp Psychiatric Diagnosis/
	6	exp "PSYCHOLOGICAL AND PSYCHIATRIC PROCEDURES, TECHNIQUES AND CONCEPTS"/ or exp PSYCHIATRIC DIAGNOSIS/ or exp PSYCHIATRIC TREATMENT/ or psychiatric.mp.
	7	psychology.mp. or exp PSYCHOLOGY/
	8	or/1-7
	9	(teletherapy or teletherapies).mp.
	10	telepsychiatry.mp.
	11	telepsychology.mp
	12	(remote and (monitor$ or consult$)).mp
	13	Satellite communication$.mp. or exp Telecommunication/
	14	(teleconference$ or teleconferencing).mp.
	15	(videoconference$ or videoconferencing).mp.
	16	telemedicine.mp.
	17	(online health or on-line health).mp.
	18	(telehealth or tele-health).mp.
	19	(ehealth or e-health).mp.
	20	(telecare or tele-care).mp
	21	(telepsychiatry or tele-psychiatry).mp.
	22	(telemental health or tele-mental health).mp.
	23	remote consultation.mp.
	24	or/9-23
	25	8 and 24
	26	limit 25 to (Danish or English or Finnish or French or German or Norwegian or Spanish or Swedish)

Table A.1: Literature search strategy (continued)

Database and Edition	#	Search Terms
CINAHL - Cumulative Index to Nursing & Allied Health Literature 1982 to June Week 1 2006	1	Exp MENTAL DISORDERS, CHRONIC/ or exp COMMUNITY MENTAL HEALTH SERVICES/ or exp MENTAL HEALTH SERVICES/ or exp MENTAL HEALTH/ or exp MENTAL DISORDERS/
	2	Exp PSYCHOLOGY/ (2374)
	3	Exp PSYCHIATRY/ (1747)
	4	Exp Psychiatric Nursing/ (9179)
	5	psychodiagnosis.mp. (3)
	6	Exp PSYCHIATRIC CARE/ or exp PSYCHIATRIC SERVICE/ (2731)
	7	Or/1-6
	8	teletherapy.mp.
	9	Telepsychiatry.mp.
	10	telepsychology.mp
	11	Exp Remote Access to Information/
	12	(remote and (consult$ or monitor$)).mp.
	13	(videoconference$ or videoconferencing).mp.
	14	telemedicine.mp. or exp TELEMEDICINE/
	15	(on-line health or online health).mp.
	16	telehealth.mp. or exp TELEHEALTH/
	17	Exp Telenursing/ or tele-health.mp.
	18	(ehealth or e-health).mp.
	19	(telecare or tele-care).mp.
	20	Exp TELECONFERENCING/
	21	Exp Remote Consultation/
	22	(telemental health or tele-mental health).mp.
	23	Or/8-22
	24	7 and 23
	25	limit 24 to (Danish or English or Finnish or French or German or Norwegian or Spanish or Swedish)

Table A.1: Literature search strategy (continued)

Database and Edition	#	Search Terms
ACP Journal Club, Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effects, Controlled Clinical Trials Register	1	mental health.mp.
	2	psychiatry.mp
	3	psychology.mp
	4	psychiatric.mp
	5	or/1-4
	6	teletherapy.mp
	7	telepsychiatry.mp
	8	telemedicine.mp
	9	telehealth.mp
	10	(remote and (consult$ or monitor$)).mp
	11	(videoconferencing or videoconference$).mp.
	12	(on-line health or online health).mp.
	13	(ehealth or e-health).mp
	14	(telecare or tele-care).mp.
	15	(telemental or tele-mental).mp.
	16	or/6-15
	17	5 and 16
	18	from 17 keep 2-4,15,28-52
Web of Science All documents All languages Databases: SCI-EXPANDED, SSCI, A&HCI Timespan=1900-2006	1	TS=(mental health service* OR mental health OR mental disorder*)
	2	TS=(psychiatry or psychiatric)
	3	TS=(psychology)
	4	TS=psychodiagnosis
	5	#4 OR #3 OR #2 OR #1
	6	TS=(telepsychiatry or telepsychology or telemedicine)
	7	TS=(online health or on-line health or telehealth or tele-health or telecare or tele-care or telemental or tele-mental)
	8	TS=(remote and (consult* or monitor*))
	9	#8 OR #7 OR #6
	10	#9 AND #5

Table A.1: Literature search strategy (continued)

Database and Edition	#	Search Terms
International Pharmaceutical Abstracts 1970 to May 2006	1	mental health.mp.
	2	Psychiatry.mp
	3	psychology.mp
	4	Psychiatric.mp
	5	or/1-4
	6	teletherapy.mp.
	7	Telepsychiatry.mp
	8	telemedicine.mp.
	9	Telehealth.mp.
	10	(remote and (consult$ or monitor$)).mp
	11	(videoconferencing or videoconference$).mp
	12	(on-line health or online health).mp
	13	(ehealth or e-health).mp.
	14	(telecare or tele-care).mp
	15	(telemental or tele-mental).mp
	16	or/6-15
	17	5 and 16

Appendix B: Finnish survey of the use of telemedicine in mental health

Questionnaire regarding use of telepsychiatric services in Finland

Background information concerning the respondent:	
Name of the unit (Hospital or treatment facility)	
Medical specialty of the unit	
Address	
Hospital district	
Contact person	
Contact person's phone number	
Contact person's e-mail	

1. **Has your unit made use of or planned to use telepsychiatry/ telemedicine in its activities (clinical activities, education, supervision of work) during the preceding year?**
    1. Not at all
    2. Planned but not used yet
    3. Tested but not yet in routine use
    4. In routine use (the service has been priced)

If you answered 1 or 2 to the preceding question, you do not need to answer the rest of the questions.

2. **Has your unit offered/received telepsychiatry/telemedicine services?**
    1. Only offered services for other units
    2. Only received services from others
    3. Both offered and received services

The following questions deal with **offering and receiving telepsychiatry services.**

3. What kind of telepsychiatry services has your unit offered or received during the preceding year?

Clinical telepsychiatry videoconferences	
Number of videoconferences per year (both those offered and those received):	
What percentage of them were services offered?	%

Videoconferences dealing with basic or advanced training	
Number of videoconferences per year (both those offered and those received):	
What percentage of them were services offered?	%
Mean number of receiving units per educational session for the education you offered:	
Mean number of attending persons per educational session you offered:	
What percentage of the educational activities you offer are delivered through videoconferencing?	1 0-10% 2 11-20% 3 21-30% 4 31-40% 5 41-50% 6 51-60% 7 61-70% 8 71-80% 9 81-90% 10 91-100%
What percentage of the educational activities you receive are delivered through videoconferencing?	1 0-10% 2 11-20% 3 21-30% 4 31-40% 5 41-50% 6 51-60% 7 61-70% 8 71-80% 9 81-90% 10 91-100%

Administrative videoconferences	
Number of administrative videoconferences per year:	
What percentage of the administrative videoconferences were offered services?	%

Videoconferences dealing with supervision of work or other similar services	
Number of videoconferences dealing with supervision of work per year (both those offered and those received):	
Number of videoconferences dealing with other similar services per year (both those offered and those received):	
What percentage of the supervision of work you **offer** is delivered through videoconferencing?	1 0-10% 2 11-20% 3 21-30% 4 31-40% 5 41-50% 6 51-60% 7 61-70% 8 71-80% 9 81-90% 10 91-100%
What percentage of the supervision of work you **receive** is delivered through videoconferencing?	1 0-10% 2 11-20% 3 21-30% 4 31-40% 5 41-50% 6 51-60% 7 61-70% 8 71-80% 9 81-90% 10 91-100%

The following questions deal with **clinical videoconferences only**

4. Units that have participated in clinical telepsychiatry during the preceding year.

How many of your institutions units/wards offer clinical telepsychiatry services?	
How may units (e.g., secondary care unit, health centre, addiction treatment unit) received your institution's clinical telepsychiatry services?	
What percentage of your clinical ambulatory services do the telepsychiatry services represent?	1 0-10% 2 11-20% 3 21-30% 4 31-40% 5 41-50% 6 51-60% 7 61-70% 8 71-80% 9 81-90% 10 91-100%
What is the percentage-wise distribution of clinical videoconferences of different durations?	0-15 min ____ % 16-30 min ____ % 31-60 min ____ % over 60 min ____ %

5. Units that have participated in clinical telepsychiatry during the preceding year.

Profession	Number of persons	Percentage of consultations by this group of all consultations per year
Psychiatrist		
Psychologist		
Other medical doctors		
Nurse		
Other healthcare professional		

6. **Do you require that, in addition to the patient, a healthcare professional must be present during the videoconference when you offer clinical services?**
    1. Yes
    2. No

7. **By your estimate, how often is a healthcare professional present at the receiving end?**
    1. Always
    2. Almost always (80-90%)
    3. Fairly often (60-70%)
    4. In about 50% of cases or less

8. **To which patient group do you primarily offer telepsychiatry services?**
    1. Primarily to new patients (first visit)
    2. Primarily to patients who have received conventional services previously
    3. Both to new and old patients

9. **To what subspecialities are your clinical videoconsultations targeted?**

Type of consultation	Mark if your institution has offered this service	Number of consultations per year	Percentage of this group's consultations of all consultations per year
Child or adolescent psychiatry			
General adult psychiatry			
Forensic psychiatry			
Geriatric psychiatry			
Addiction services			
Eating disorders			
Brain injuries			
Psychological testing			

Other subspecialty (please specify)			
Type of consultation	Mark if your institution has offered this service	Number of consultations per year	Percentage of this group's consultations of all consultations per year

10. Any other comments concerning telepsychiatry or telemedicine that you might have?

Thank you for your response.

Appendix C: Papers reporting details on routine use of telemental health

Abbreviations

FTF - face to face
GP - general practitioner
ISDN - Integrated Services Digital Network
mo - month(s)
NSW - New South Wales
VC - videoconferencing
y - year(s)

Table C.1: Papers reporting details on routine use of telemental health

First author, study setting	TMH service, phase	Organization of service	Approach to study	Timelines
Cruz M, 2005[13] Arizona, USA	Psychiatry VC Established, first 5 y of operation	University hospital with links to 6 rural sites	Retrospective review of administrative and consult data, plus satisfaction for early years	1998 to 2002, and 1999 to 2000 for satisfaction responses
Gammon D, 1996[23] Northern Norway	Psychiatry VC Established	Approximately 50 video units, 15 in mental health institutions	Paper questionnaire, 184 completed by 26 institutions 1028 participants, 21% psychologists, 20% psychiatric nurses, 17% psychiatrists	Survey in Dec. 1995. Covered period June to Dec. 1995
Gelber H, 2001[24] Victoria, Australia	Child/ adolescent psychiatry VC Established	27 telepsychiatric facilities in regional Victoria, 6 specialist locations	Telephone survey, 25 clinicians in 5 of 8 regions	Survey in 2001
Gilbert H, 2005[19] London, UK	Smoking cessation Telephone Established	Quitline service and hospital-based smoking clinic	Surveys of callers to the Quitline, persons attending smokers' clinic; results from these groups compared with data for smokers in the 2000/2001 General Household Survey (GHS)	Surveys in May and June 2000 (Quitline), and May 2000 to April 2001 (clinic)

	Patient numbers, sessions	Type of use	Comparison with non-telemedicine	Overall context of health system
	n = 206, including 47 children/adolescents; n = 1086 consults Ethnic proportions by year (diagram)	All clinical. Major depression 51/159, diverse other diagnoses n = 206 (19%) initial consults, remainder follow up Median 2 consults per patient; 75% pediatric had single consult, 70% adults had >1	No	Rural patients, no details of other mental health services
	140 video sessions, 185 h 2 mental health hospitals in 37% and 29% of sessions, 24 others between 1% and 33% Increase over 6 mo associated with ISDN introduction	Purposes of VC use (proportions of respondents) included: 21% training and supervision 14% direct clinical (not necessarily with patients) 10% distance education	Yes If telepsychiatry not available, 59% would travel for FTF consults, 25% would not have a consult, 14% would use telephone, 2% fax or mail Authors note only 12 sessions (1%) involved consultations with patients	Reference to availability of specialists in Northern Norway
	64% had used for >18 mo, 20% 7 to 12 mo 60% used >30 times, 24% used 20 to 29 times	92% used for clinical/supervision 36% had used for teaching	No	No
	n = 1162 Quitline callers and n = 1127 attending clinic (n = 14,089 in GHS)	Assistance to quit smoking Women and older smokers more likely to seek help from clinic, Quitline attracted more calls from younger smokers. The age profile of helpline callers corresponds more closely to that of the general population of smokers than does the age profile of clinic attenders.	Yes	No (comparison with smokers in general population)

Table C.1: Papers reporting details on routine use of telemental health (continued)

First author, study setting	TMH service, phase	Organization of service	Approach to study	Timelines
Herreros O, 2002[20] Canary Islands, Spain	Child psychiatry Telephone service Established	University hospital and physician practices Telephone-based service	Review of administrative records and diagnostic results	2 y period starting Feb. 1999
Hockey AD, 2004[14] Queensland, Australia	Child psychiatry VC and telephone Pilot project	7 remote health services and children's hospital	Review of administrative records and survey of mental health workers	6 mo commencing Feb. 2003
Kates N, 1997[25] Hamilton–Wentworth, Ontario, Canada	Psychiatry Established	Psychiatrist and 5 practices with 18 family physicians	Records from monitoring telephone calls	12 mo period
Kennedy C, 2000[15] Queensland, Australia	Psychiatry VC Probably recently established telepsychiatry service, but unclear	Rural hospitals and general practices, link to teaching hospital	Administrative/ medical records	Over 2 y period
Ledek V, 2002[21] Mid–west NSW, Australia	TMH, including psychiatry Telephone First 15 mo of operation	Free call to telephone Mental Health Information and Support Service	Analysis of routine administrative data, triage assessments + 2 week survey	12 mo before and after implementation of service in 2000
Mielonen M-L, 1998[1] Oulu, Finland	Psychiatry VC First 2 y of operation	University hospital and ~20 remote sites	Analysis of administrative data	1996 and 1997

	Patient numbers, sessions	Type of use	Comparison with non-telemedicine	Overall context of health system
	500 to 2000 calls per mo; 300 to 500 per mo attended	76% phone queries resolved without medical visit being needed within 10 d, 92% avoided a medical visit or a medical problem	No	No
	n = 17 (15 video, 2 telephone), + n = 2 FTF, as telepsychiatry was decided to be inappropriate	n = 28 teleconsults: 17 clinical, 9 administrative, 2 educational	No	No
	n = 128 calls, 10.7 per mo	63% calls from physicians, 37% from counsellors 39% related to patients in crisis, 61% to non-urgent for patients already seen	No	Yes, related to number of patients in the practices (approximately 24,000); also details on physician numbers
	n = 32 for telepsychiatry, 92 FTF	Groups somewhat different clinically. Anxiety greater among telepsychiatry group.	Yes Similar age and sex distribution 100% telepsychiatry referral and 27% FTF referrals from GPs	No
	1117 calls per month. Most for information and support, 13% required a triage assessment of which 13% resulted in an emergency response 43% reduction in activation of after-hours services	From triage assessments of 11% of incoming calls: 24% high risk 27% medium risk, response within 12 h 39% low risk, response within 48 h 11% inappropriate	Yes	Yes, though no data on overall mental health services
	249 h of teleconferencing in 1996 and 434 h in 1997 (1410 normal consults in 1994 and 1468 in 1997)	In 1997: 45% teaching 26% clinical 23% training 6% administrative	Yes	Yes, details of remote area services

Table C.1: Papers reporting details on routine use of telemental health (continued)

First author, study setting	TMH service, phase	Organization of service	Approach to study	Timelines
Myers KM, 2004[16] Washington state, USA	Child and adolescent psychiatry VC First 18 mo of operation	Children's hospital and 2 remote clinics	Analysis of administrative data, diagnostic data, billing sheets	Oct. 2001 to Mar. 2003
Sheerin DF, 1994[22] Glasgow, UK	Adolescent psychiatry Telephone Established	Telephone consultancy service	Audit of calls received	Oct. 1990 to Jan. 1992
Simpson J, 2001[4] Alberta, Canada	Psychiatry VC First 2 y of routine operation, following pilot study	Major psychiatric hospital and 5 hospital clinics at distances of 80 to 214 km	Hospital administrative data; psychiatrists' manual logs; questionnaire survey of participating and GPs	1997 and 1998
Urness D, 2004[9] Canada	Psychiatry VC, some telephone, videophone Established + initial use in 2 programs	14 Canadian telepsychiatry programs in 12 jurisdictions	Survey by questionnaire	Calendar 2001
Whitten P, 2004[17] Michigan, USA	Psychiatry VC and videophone Initial 2 y of program	Links from urban clinic to rural clinic, a jail, youth centre, crisis home facility, and patients' homes	Administrative data and patient charts Comparison of convenience samples for demographics, etc.	Feb. 2001 to May 2003

	Patient numbers, sessions	Type of use	Comparison with non-telemedicine	Overall context of health system
	n = 159 (comparison group n = 210)	All clinical Broad range of diagnoses, generally similar between sites for all age groups	Yes, compared with usual outpatient psychiatric care (convenience sample, not formal control group) Telepsychiatry offered service to a population broadly comparable to that in usual outpatient care; also the services were clinically comparable	No
	n = 69 calls, 48% from Social Work Department	46.5% regarding request for referral 30.5% regarding appropriateness of referral 7% regarding services available	No	No
	n = 379, n = 546 consults Approximately 150 additional sessions per year for administrative and clinical committee meetings	Main reasons for consultation were management of diagnosed condition and establishment of diagnosis. 85% consults adult general psychiatry, 10% geriatric psychiatry	Opinion from health professionals; no administrative or outcomes comparison	Considered effect of telepsychiatry service on referral patterns for other mental health services (little effect noted) 10.7% patients admitted to hospital within 6 mo of consultation date
	n = 3339 consults in 13 programs clinical: adults: 59%, 107 per million children: 36%, 194 per million geriatric: 5%	62 clinical consults per delivery site 46% consults for initial assessment 388 education sessions in 13 programs	No	No
	Overall n = 297 patients, 578 consults	Diagnoses: 39% depression, 20% schizophrenia, 41% other	Yes: telemedicine and non-telemedicine patients similar in demographics, medication, hospitalisation, and diagnoses	No

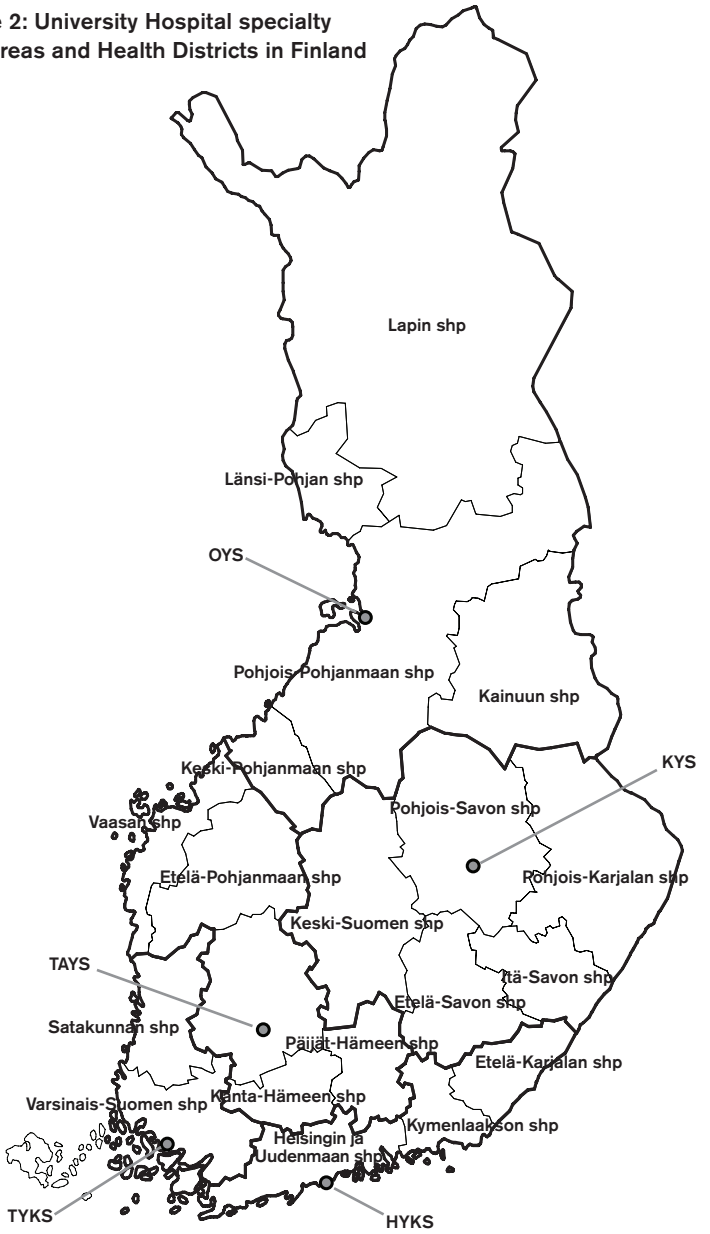
Table C.1: Papers reporting details on routine use of telemental health (continued)

First author, study setting	TMH service, phase	Organization of service	Approach to study	Timelines
Zaylor C, 2000[18] Kansas, USA	Psychiatry VC Pilot project	Link between medical centre and a jail	Administrative and diagnostic data	Unclear, program start-up in 1998

	Patient numbers, sessions	Type of use	Comparison with non-telemedicine	Overall context of health system
	Total n = 264 consults, average 34 per month	Most common diagnoses: depression 20%, bipolar disorder 15%, psychotic disorders 15% 27% initial consults, 73% follow-up visits	No	No

Appendix D: University Hospital specialty care areas (OYS, KYS, TAYS, TYKS, and HYKS) and Health Districts (SHP) in Finland

Figure 2: University Hospital specialty care areas and Health Districts in Finland



For a closer look at the Finland map, see:
http://www.suomi.fi/suomifi/english/a_z_index/map_of_municipalities_and_communities/index.jsp

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