

HEALTH WURCNET PARTNERSHIP PROPOSAL
TELEMEDICINE --THE WESTERN CONNECTION*

Proposal to CANARIE

Canadian Network for the Advancement of Research, Industry & Education
The Technology Development & Technology Diffusion (TD)² Program

Submitted by:

WurcNet Inc.
A Western University and Industry Research Consortium
on
High Performance Networking and High Performance Computing

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* Previously submitted as Remote Consultative Network (RCN) - The Western Connection

**HEALTH WURCNET PARTNERSHIP PROPOSAL
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**Faculty of Medicine
University of Calgary**

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EXECUTIVE SUMMARY

Health care reform and economic realities are reshaping the health care, health research, and health training industries. Given the realities of restructuring the health care system, telemedicine can help maintain and support the integrity and high quality of three health program areas: health care delivery, health research, and health training. In so doing, it can foster the continued leadership that Canada and Western Canada have held in the health industry in the past. An end-point of adopting this innovative concept can be a seamless state of the art clinical, research, medical education, and administrative health environment for the west.

Leaders from within the health industry and private industry have partnered for this initiative. Specifically within the health sector, five committed partners are currently on board: The Faculty of Medicine, University of Calgary; The Faculty of Medicine, University of Alberta; The Foothills Hospital, Calgary; The Calgary General Hospital; and The Drumheller Regional Health Complex; The College of Medicine, University of Saskatchewan; The Faculty of Medicine, University of Manitoba; and The Faculty of Medicine, University of British Columbia. AGT Limited is the major Telco company with which the health partners will ally. Silicon Graphics have offered the project participants the benefit of utilizing their technology, as well as reductions 15% to 25% beyond standard for related purchases. Further, cash donations have been pledged if the proposal is successful. IBM has outlined possible areas of partnership, including professional services, project technical resources, and software. Hughes Aircraft of Canada Ltd. and Hughes Aircraft Co. have worked with the Faculty of Medicine, University of Calgary and AGT Ltd. in the past and have expressed support for expanding relationships. The strength of commitment to this initiative by all partners is indicated by the current commitment to-date: total upfront hard dollar pledges of \$490,000.00, in-kind contributions of \$49,000.00, and additional opportunities for lower acquisition costs and use of technology. The initiative's total budget is estimated to be approximately \$3,000,000.00. The total request from CANARIE is \$500,000.00.

Two products are involved in this submission. The *first* product is the development of a low cost telemedicine system package for use and purchase by health care institutions and providers in Western Canada. The package (hardware, software, interface, training and network access equipment) would optimally serve the academic and community telemedicine applications being generic in design to permit extensive networking and interfacing. It would offer a range of clinical, educational, research, and administrative options to multiple-end users: patients; health care consumers; physicians; other health care providers; researchers; health administrators; health educators; and medical and health professional trainees. Drs. Mo Watanabe and Penny Jennett, Faculty of Medicine, University of Calgary will take the lead with this product.

The purchase and implementation of this telemedicine system package potentially has two end results: revenue generation and cost savings to the health care system. Revenue estimates of the Alberta market for a telemedicine system package at maturity are approximately \$10 to \$15 million. Further, it is felt that this initiative can generate approximately \$225 million in the Canadian market. Secondly, the telemedicine system in operation would assist Canada and the provinces in providing access to high quality, cost effective health care and educational opportunities for all Canadians irrespective of geographical location. As well, the submission has the potential to contribute to rural economies and employment. Estimated collective annual savings to the health care system for two of the clinical applications outlined in this submission are \$20,062,000.00. Actual health savings to the health care system and consumers during a ten month trial using a telemedicine package limited to clinical options and two sites was \$11,058.32.

The *second* product is software development; more specifically a network interface standard. This software will provide the necessary medical imaging and video transfer standard to support the transfer of high quality image and video traffic in a broad band (ATM) environment. The product will stimulate the need for, a use of broad band networks in Canada, by satisfying the broad band standards requirements for defined and evolving commercial industry applications, such as telemedicine systems and medical research storage and retrieval. AGT Limited will retain the responsibility for R and D with respect to this project. AGT estimates by 1998, the Western Canadian market for broad band services will be 42 million per year if the usage is stimulated by creation of an image and video transfer standard to facilitate developments of high usage applications such as Telemedicine - The Western Connection.

The liaison between health and private industry provides a built in mechanism to ensure optimal promotion and marketing of the products. Partners from the health industry have well established respective linkages into the health and government environments. Private industry partners have strong proven marketing, sales and service infrastructures in place.

Telemedicine - The Western Connection is in keeping CANARIE mandate in that it highlights several noted priority health applications: collaborative diagnosis, high resolution image transfer, distance education and radiation applications. In addition, it also responds to the needs of several targeted CANARIE audiences: rural/urban hospitals, physicians, medical researchers, teaching hospitals, and the medical supply sector. As well, this initiative is aligned with CANARIE's goal to improve the Canadian telecommunication infrastructure and support the development of Canadian information technology exports.

WurcNet Inc. is the lead contractor for this initiative. This is one of five (TD)² Wurcnet submissions; therein, resides an additional strength, i.e., the liaison with multiple university and industrial colleagues all of whom have broad mutual Western and Canadian telecommunication goals.

**TELEMEDICINE - THE WESTERN CONNECTION
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I. THE PHILOSOPHY OF TELEMEDICINE APPLICATIONS IN WESTERN CANADA

Health care reform and economic realities are reshaping the health care, health research, and health training industries. Given the realities of restructuring the health care system, telemedicine applications can help maintain and support the integrity and high quality of health program areas: health care delivery, health research, and health training. In so doing, it can foster the continued leadership that Canada and Western Canada have held in the health industry in the past. Specifically, the proposed telemedicine applications can foster and promote:

- Leading edge competitiveness among Western researchers and clinicians by providing state-of-the-art audio, video, and image communication linkages among the top ranking health institutions in the West.
- R & D in telecommunication technology as applied to health care. An opportunity for field testing the feasibility of broader telemedicine applications with multiple health care environments, in various geographical sites across the Western provinces. R & D regarding the feasibility, effectiveness and efficiency of telemedicine applications using designed transmission highways for four health areas (research, clinical service, education, and administration) is fundamental to the continued effective advancement of such technology.
- The restructuring and rationalization of health care services by minimizing duplication of clinical and educational services and programs by centralization.
- Improved, ready and equal access to health care irrespective of geographical location of patients and health care providers.
- Cost savings to health care delivery due to local provision of services, and reduced transportation costs. Local (rural and remote) provision of services fosters local community economies; and provides employment and revenues for local residents.
- Enhanced continuing professional education in the health fields.
- Efficient communication networks for health care administrators, practitioners, student trainees (undergraduate, postgraduate, and graduate), eg. interviewing irrespective of geographical locations of interviewers and interviewees.

An end-point of adopting this innovative concept can be a seamless state-of-the-art clinical, research, medical education, and administrative health environment for the West.

II. RATIONALE FOR THIS INITIATIVE

- i) **Impact and Aims of Health Care Reform:** Telemedicine is a technology that supports the maintenance of quality care, the integrity of academic teaching programs, and accessibility to unique expertise and resources, making rationalization and restructuring of the health care system possible. The need for considering telemedicine applications are as follows:

- Each province is planning to rationalize health care services to make it more cost effective, to eliminate duplication, and to centralize services where possible. This will lead to the creation of a single provincial service unit in the case of sophisticated, tertiary care service, and in some instances there may be only one unit in the four Western provinces. A similar rationalization of Western regional postgraduate training programs in sub-specialties among the five Western medical schools is being explored.
 - Rationalization of health services, research, and teaching programs at a single site creates the need for timely access to tertiary care services from other academic health sciences centres.
 - Equitable access to health care services remains an important objective that must be preserved as health care reform and economic realities reshape the health care and academic industry.
 - Efficient administrative communications are required. Student (medical student, residents, graduate students) and faculty interviews can be conducted irrespective of geographical location. Administrators in charge of educational, research, and clinical programs can dialogue and collaborate without travel at a chosen time convenient for exchanges. Student bodies across the West can communicate in a similar manner.
- ii) **Rural Practitioners and the Need for Remote Consultation:** A telemedicine network provides timely access to specialty consultations and continuing medical education for family physicians and other health care providers in rural or remote areas. It also permits the provision of care at local sites; thereby enhancing the economy of the community and providing employment opportunities for local residents. The need to consider this approach follows:
- Geographic distribution of physicians in Canada is not optimal. About 24% of the population of Canada resides in rural communities with populations of less than 10,000, while 20% of family physicians and 4% of specialists practice in such locations. Sub-specialists by necessity are located in tertiary care facilities in urban centres.
 - The growth in the number of Canadian physicians will be constrained in the future. Current initiatives in physician resource management include a 10% reduction of undergraduate medical enrolment, a 10% reduction in postgraduate training positions, reduction in the number of visa trainees, and reduction in immigrant physicians.
 - Specialist supply will be affected to a greater extent than family physicians. Attrition of specialists is more rapid, and addition of new specialists is slower than that of family physicians.

- The relative specialty shortage is already leading to relocation of specialists from rural to urban centres.
- Economic realities are forcing realignment of resources and services, leading to greater service demands on rural facilities.
- Physicians indicate the need for ready availability of consultants and opportunities for continuing medical education if they are to locate their practices in rural and remote communities.

III. PRODUCTS

- Product I--A low-cost telemedicine system package (consisting of hardware, software, interface, network access equipment, and training) for use and purchase by health care institutions and providers in Western Canada. The system would offer a range of clinical, educational, research, and administrative options to multiple end users: health care consumers; physicians; other health care providers; researchers; health administrators; health educators; and medical and health professional trainees.
- Product II--Software development consisting of the necessary medical imaging and video transfer standard to support the transfer of high quality image and video traffic in a broad band (ATM) environment. This product will stimulate the need for, and use of, broad band networks in Canada, by satisfying the broad band standard requirements for defined and evolving commercial industry applications. AGT Ltd. will lead the development of the standard. Industry partners will build and test the standards by incorporating the necessary communication software into their systems.

Both products are described in detail in Section VI.

IV. RESPONSE AND LINKAGE TO CANARIE INITIATIVE

The Western Telemedicine initiative is in keeping with the CANARIE mandate in that it highlights several noted priority applications: collaborative diagnosis, high resolution image transfer, distance education and radiation applications. In addition, it also responds to the needs of several of the CANARIE targeted audiences: rural/urban hospitals, physicians, medical researchers, teaching hospitals and the medical supply sector. The proposed initiative will bring researchers, scientists, clinicians (specialists) educators from the western provinces together to conduct R & D and professional commitments. This sharing of intellectual expertise and experience will contribute to Western Canadian and Canadian competitiveness in the health field. This initiative supports product/service development which will encourage private sectors to bring network-related products and applications to market. The application brings imagination

and energy to the health care delivery, educational, research, and administrative challenges that lie ahead. It encourages questions which address major health issues such as quality, access, and costs. In addition, the initiative is aligned with CANARIE's goals to improve the Canadian telecommunications infrastructure and support the development of Canadian information technology exports.

V. **PARTNERS IN THE INITIATIVE** (Letters of Commitment, Support & Interest - Appendix A)

Committed Partners
Health Industry

- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Faculty of Medicine, University of Calgary • Faculty of Medicine, University of Alberta • College of Medicine, University of Saskatchewan • Faculty of Medicine, University of Manitoba • Faculty of Medicine, University of British Columbia | <ul style="list-style-type: none"> • Foothills Hospital, Calgary • Calgary General Hospital • Drumheller Regional Health Complex • University of Alberta Hospitals • Southern Alberta Regional Geriatric Program |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Private Industry

- AGT Ltd.
- Silicon Graphics
- IBM
- Hughes Aircraft Canada Limited (relationship being defined)
- Hughes Aircraft Company (relationship being defined)

Potential Partners

Health Industry

- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Alberta Health • Saskatchewan Government • Saskatchewan Medical Association • Saskatchewan District Health Boards • Saskatchewan Allied Health Services • Saskatchewan Public | <ul style="list-style-type: none"> • Manitoba Health Services Commission • Federal Authorities • University of Manitoba, Department of Videotechnology • PMAC/MRC • CDP Inc. |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Private Industry

- Siemens Electric Limited
- Northline Telecommunications Inc.

VI. PRODUCT DETAILS

A. Product I - A Telemedicine System Package

Description: A low-cost telemedicine system package for use and purchase by health care institutions and providers in Western Canada. The system can be housed in faculties of medicine, regional health care centres/hospitals, rural/remote health care centres/hospitals, other health care facilities and physicians' offices. The package consists of hardware, software, interface, training, and network access equipment.

This alternative form of offering health programs provides a range of options to multiple end users: patients and health care consumers; physicians (specialists, sub-specialists, family, urban/rural/remote); other health care providers (e.g. nurses, physiotherapists, dietitians); researchers; health administrators; health educators; and medical and health professional trainees. The options are as follows:

- Professional services - elective, urgent and emergency professional consultations, including patient interviews and examinations.
- Technical consultations - high resolution image transfer (Computerized Axial Tomography, Magnetic Resonance Imaging, ultrasound, nuclear medicine) and consultation for diagnostic, investigative, and management decisions, such as fetal monitoring, EKG/EEG, electronic stethoscope, funduscopy, and microscopic images, etc.
- Educational services, - networking, sharing and communication among undergraduate, postgraduate and continuing medical education training, with access to computer-assisted and decision-support software applications, access to central and major library resources, and access to allied health partners.
- Administration and communication services including E-mail, video and audio teleconferencing and interviewing candidates, and bulletin boards.
- Research networking among leading edge researchers and research groups.
- Networking among leading edge clinicians (sub-specialists, specialists, primary care) and clinical groups.

The service options housed in the system can be accessed and distributed over several network access options: high speed broad band ATM networks, centrex data, micro-link, satellite, and dedicated T₁.

Budget Estimates, Commitments, and Requests for product I - Tables I and II.

Timeframe/Deliverables - Table III

Phase I - 12 Month Period - 1994

Program	Estimated Budget		Committed to date (other funds will commit if submission is successful and programs evolve)		Requested from CANARIE (Matching Funds)
	Capital	Operating	\$	In-kind	
Faculty of Medicine, University of Calgary (Host site - Lead site; evaluation site - which will liaise with all programs and maintain ongoing linkage with the Drumheller Regional site.)	\$150,000 (1 system)	\$150,000 (See Appendix C for detailed budget)	\$ 75,000 (operational)	\$7,500 - Equipment, materials, space, shared utilities, computer services, travel & accommodation, clinical, research, educational, and administrative expertise & experience	\$75,000 (operational)
Faculty of Medicine, University of Alberta	\$900,000 (6 systems)	\$280,000 (1 host site \$80,000; and 5 remote sites \$200,000 - \$40,000 each site)	\$ 75,000 (capital)	\$7,500 - Equipment, materials, space, shared utilities, computer services, travel & accommodation, clinical, research, educational, and administrative expertise & experience	\$75,000 (capital for 1 RCN unit)
Foothills Hospital	\$750,000 (5 systems)	\$240,000 (1 host site \$80,000; and 4 regional sites - \$40,000 each site)	\$100,000**	\$10,000 - Equipment, materials, space, shared utilities, computer services, travel & accommodation, clinical, research, educational, and administrative expertise & experience	\$100,000
Calgary General Hospital	\$ 600,000 (4 systems)	\$200,000 (1 host site and 3 connecting sites)	\$150,000 ((\$75,000 capital; \$75,000 operational)	\$15,000 - Equipment, materials, space, shared utilities, computer services, travel & accommodation, clinical, research, educational, administrative expertise & experience	\$150,000
Total	\$2,400,000	\$870,000	\$400,000	\$40,000	\$400,000

* Cap = Capital; Op = Operational; ** A minimum of \$100,000 for an anticipated 5 years

Product I
Overall budget summary - Phase II
Phase II - 1995

Program	Estimated Budget		Committed to date	Requested (Matching Funds)
	Capital	Operating		
Faculty of Medicine, University of Saskatchewan	\$900,000	\$280,000 (1 host site \$80,000; and 5 remote sites \$200,000 - \$40,000 each site)	0	0
Faculty of Medicine, University of Manitoba	\$900,000	\$280,000 (1 host site \$80,000; and 5 remote sites \$200,000 - \$40,000 each site)	0	0
Faculty of Medicine, University of British Columbia	\$900,000	\$280,000 (1 host site \$80,000; and 5 remote sites \$200,000 - \$40,000 each site)	0	0
Total	\$2,700,000	\$840,000	0	0

* Cap = Capital; Op = Operational

Phase I - 1994
(The Alberta Committed Programs)

Timeframe/Deliverables

	1994					1995							
	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March
Assessment and identification of needs (2 months)	----->												
Outline of system specifications (2 months)	----->												
Outline purchasing and installation schedule (2 months)	----->												
Purchase of systems and wiring installation (3 months)	----->												
Series of mock scenarios to test the systems (3-5 months)													
Trial phase for all required applications to comments (7-9 months)													
Operation													

Phase I

1. Faculty of Medicine, University of Calgary
2. Faculty of Medicine, University of Alberta
3. The Foothills Hospital Programs
4. The Calgary General Hospital Programs
5. Southern Alberta Geriatric Service

Phase II - March 1995 to March 1996

- i) Programs and services outlined in Phase I will move to operational and field test stage.
- ii) Proposed programs and sites in the provinces of Manitoba, Saskatchewan, and British Columbia (depending upon forthcoming dollar commitment), will commence following the staged steps as outlined in Phase I, ii), iii), and iv).

* * * * *

At the conclusion of this phase, an end product and system ready for full market implementation across Canada and beyond should be in place. It is expected that the end product and system will undergo continuous quality assessment, with upgrading applied to insure ongoing optimal service.

Evaluation Approach

A program evaluation protocol appropriate to assess the programs identified in the Western telemedicine connection has already been developed and piloted over a 12-month period. Details of procedures within this program evaluation activity, along with sample research questions, are outlined in Appendix C. Individual research questions outlined within each of the programmes will be addressed through appropriate research analyses and methodology.

B. Product II - Medical Imaging and Video Transfer Standard Software

Description: Software development consisting of the necessary medical imaging and video transfer standard to support the transfer of high quality image and video traffic in a broad band (ATM) environment. This product will stimulate the need for, and use of, broad band networks in Canada, by satisfying the broad band standard requirements for defined and evolving commercial industry applications. AGT Ltd. will lead the development of the standard. Industry partners will build and test the standards by incorporating the necessary communication software into their systems.

Rationale: At this time, there is no workable ATM platform standard for video conferencing in the health care environment. The only solution is to use standard T1 or fractional T1 access rates in a slow-switched or circuit-switched environment. This also requires a video codec to compress the video into a narrow bandwidth. Hughes Aircraft, in conjunction with AGT and The University of Calgary, has developed a terminal device that uses a proprietary video compression algorithm. An opportunity exists to expand the universality of this application by including an ATM interface for broadband transmission.

Revenue generation by broadband network usage stimulation: AGT estimates by 1998, the Western Canadian market for broadband services will be \$42 million per year if the usage is stimulated by creation of an image and video transfer standard to facilitate developments of high usage applications such as telemedicine. Of this, \$14 million in new network revenues would be expected within the province of Alberta. There would also be secondary market stimulation for network switching equipment and cable suppliers, CPE installation and maintenance labourers, inside wiring vendors, etc. This could be estimated at 10% of telecommunication system sales plus \$25 million (60% of broadband service revenues).

Timeframe/Deliverables

Phase 1 - Working with an Industry Forum

An Industry Forum consisting of representatives from system suppliers, WurcNet, The University of Calgary, Alberta Health, and AGT Ltd. would participate in developing a draft standard. The primary goal of the Forum would be to develop a workable solution for medical imagery and video technology over broadband networks. This solution would then be standardized for use within the WurcNet community

networking hospitals together for medical image transfer and video conferencing. From AGT's perspective, this would translate to one full-time person working in the Industry Forum.

Since ATM roll-out in AGT's network will not be wide spread, some interoperability standard will have to be developed between ATM and various Narrow-band Codecs such as H.320, CLI or Picture Tel.

This ATM Interface Standard should also incorporate the Multipoint Video Conferencing functionality. This capability could be incorporated into a device such as a video server that can handle multiple simultaneous and fully-interactive video sessions, or be built into network interface communication software which incorporates the multipoint video aspect into the telemedicine system terminal. This would give the user the flexibility to establish fully interactive sessions or just simply broadcast type sessions. All possible aspects would be reviewed by the Industry Forum to determine feasibility of incorporating this functionality into the terminal equipment.

Phase 2 - Setting up an Industry Test Bed

Once a draft standard is developed by the Industry Forum, a test bed would be required for the Industry participants to develop, test and modify the interworking standards using industry applications. By utilizing the WurcNet ATM testbed, incremental development costs will be minimized. Test plans would need to be developed outlining the utilization of all these industry applications in the test bed environment.

Phase 3 - Industry Testing (Technology Field Trial)

Once prototype network interface communication software is developed by the manufacturer, a field trial will be set up between various hospitals and universities in Western Canada using the WurcNet ATM as a backbone and extending offnet access where necessary.

Budget Estimates:

Phases	Estimated Schedule (completed by...)	Committed Capital	Committed In-Kind	Requested from CANARIE
Phase 1	end of 2nd Quarter, 1994	\$10,000.00		
Phase 2	end of 3rd Quarter, 1994	\$50,000.00		
Phase 3	end of 4th Quarter, 1994	\$30,000.00		
TOTAL:		\$90,000.00	\$10,000.00	\$100,000.00

OSI Model:

	Layer 7	Application Layer	Provides user interface to lower levels
	Layer 6	Presentation Layer	Provides data formatting and code conversion
	Layer 5	Session Layer	Handles coordination between processes
	Layer 4	Transport Layer	Provides control of quality of service
	Layer 3	Network Layer	Sets up and maintains connections across the network
ATM>	Layer 2	Data Link Layer	Provides reliable data transfer between terminal and network
ATM>	Layer 1	Physical Layer	Passes bit stream between terminal and network

Programs to Use Products

1) *The Faculty of Medicine, University of Calgary*

Contact Persons: Dr. Mo Watanabe and Dr. Penny Jennett

The Faculty has been actively involved for the past nine months in a pilot project between Drumheller Regional Health Complex and the Faculty of Medicine. This pilot provided professional (elective, urgent, and emergent), and technical (e.g., ultrasound, fetal monitoring, EKG/EEG, electronic stethoscopic, funduscopy, microscopic images, laboratory and x-ray) consultations, real-time and off-line for patients in the Drumheller rural catchment area by two-way computerized integrated video technology. This consultative service was known as the Remote Consultative Network (RCN). The RCN was developed through a three-member partnership: the Faculty of Medicine at the University of Calgary, Hughes Aircraft, and AGT Limited. As patient transportation costs were reduced and care was delivered at the regional site, cost savings of \$11,058.32 occurred over the first 41 clinical encounters.

Based upon feedback from the pilot, the Faculty will now expand its focus beyond the pilot to field-test not only clinical applications, but research, educational, and administrative as well. It will also expand its immediate partnership to incorporate other Faculties of Medicine (e.g. University of Alberta) and hospitals (see Foothills Hospital [page 12]; Calgary General Hospital, [page 13]).

2. *Faculty of Medicine, University of Alberta*

Contact persons: Dr. D. R. Hardwick and Dr. P. Davis

Applications

- Clinical
 - Northern Remote Consultative Network to 5 sites
- Education
 - Transmission of quality interactive medical, surgical, and radiology rounds
 - Distance learning and continuing health education programming
- Research

- Clinical and basic research - interprovincial interest groups and research networks; special projects
- Application permits communications beyond current geographical confines

3. *Foothills Hospital Programs*

Contact persons: Dr. Larry Bryan, President, Foothills Hospital; Dr. Garnet Sutherland, Foothills Hospital

i) The Foothills Hospital Stroke Program: Linkage between at least two tertiary hospitals, two faculties of medicine, and regional and small hospitals in the province will result in multiple savings. "Stroke remains the third most prominent cause of death and leading cause of disability in Canada. 50,000 new cases occur each year in Canada (6500 in Alberta), giving a Canadian prevalence of 180,000 (21,600 in Alberta). The costs of rehabilitation services, acute inpatient care, outpatient, and chronic care is staggering. Any improvement in outcome or reduction in stroke frequency and severity, no matter how seemingly small, would have a tremendous impact on our social and economic system, as well as on the individuals who suffer a stroke. Specifically, the estimated costs of stroke, including direct cost of health care and indirect costs of lost income and productivity, is estimated to be \$1.6 billion per year (200 million/year in Alberta). Effective treatment, for instance to reduce the resulting morbidity by even 10 to 20%, would have an economic impact while addressing immeasurably the quality of life of those afflicted. Telemedicine applications within the stroke program would consolidate and build upon the existing medical and scientific expertise of Southern Albertans who are involved in a concerned effort to undertake and treat stroke. Inpatients, outpatients, rehabilitation, and hostel services within the community and tertiary medical centres would use the telemedicine system for diagnostic, treatment, rehabilitation, follow-up, community education, and research investigative programs.***

ii) On-site speciality consultations to rural and small urban centres. The opportunity to have this done on-site provides a wide opportunity to enhance the quality of care and reduce excessive utilization of resources through dissemination of guidelines by telemedicine and by the prevention of needless transfers to higher cost institutions like the Foothills.

4) *Calgary General Hospital Program*

Contact person: Dr. Tom Rosenal

Telemedicine, clinical, research, educational, and administrative applications will be applied to the Calgary General's premium program areas: trauma, rehabilitation, psychiatry, and neurosciences.

5) *Southern Alberta Regional Geriatric Program (SARGP)*

(Have already expressed interest in using telemedicine system after trialing with the Faculty of Medicine) (Will liaise with above programs)

*** Foothills Medical Centre, Southern Alberta Stroke Program Document

Regional outreach services for SARGP were planned following a series of meetings held with representatives from small communities and regional centres in Southern Alberta. The needs in the area of geriatric care identified by their communities fell into the categories of clinical consultation, education, and administration. The lack of geriatric specialists in smaller and rural communities and the inability of the frail elderly to access the specialists in Calgary were problems noted by all centres. Present fiscal and staffing restraints along with other challenges including varied community size, distance between centres, and the complexity of geriatric care are preventing all identified needs from being met. SARGP feels that a telemedicine network would alleviate the problems of travel time for the physician, decrease the difficulty in accessing geriatric services for rural patients, allow for education of health care professionals, and permit the multi-disciplinary team the opportunity to do both a verbal and visual exam of the patient.

Planned Programs in Phase Two if Funding Available

1) *College of Medicine, University of Saskatchewan*

Contact person: Dr. D. R. Popkin and Dr. J. Spooner

The College of Medicine, University of Saskatchewan, is fully in agreement with the need for a network, particularly in light of the long distances some patients must travel for specialist care and in light of the College extending its teaching into non-urban sites.

Connections between Royal University Hospital in Saskatoon (the major teaching hospital of the College of Medicine) and two external teaching sites--Ile-à-la-Cross (remote) and Melfort (rural) are initial plans.

Potential Partners: Saskatchewan Government, Saskatchewan medical profession, District health boards, Allied health services, Public

2) *The Faculty of Medicine, University of Manitoba*

Contact person: Dr. B. Kirk

At this stage, the Faculty of Medicine, University of Manitoba has expressed interest in participating in the WuroNet Health Partnership Proposal. They have identified two separate areas of opportunity:

- The first is inter-provincial a) with opportunities for high-speed data transmission of very large blocks of data such as those used by Les and Noralou Roos and b) the opportunity for inter-university teaching such as departmental rounds, lectures and so on.
- The second is a remote consultative network. In Manitoba there are two northern remote sites, Thompson (provincially funded) and Churchill (federally funded). Both generate enormous cost in air transport to Winnipeg for diagnosis and treatment. Both the provincial and federal governments have great interest in the provision of specialty services to these sites.

Potential Partners: The Manitoba Health Services Commission, the federal authorities providing support for remote radiology consultation services, The University of Manitoba (Department of Videotechnology)

- 3) *The Faculty of Medicine, University of British Columbia*
Contact person: Dr. David Hardwick
- Diagnostic consultative activities by distance
Specifically, considerable interest by the Department of Family Practice for clinical activity in the Vancouver locus and also in the distance areas, particularly in Nanaimo; the Department of Pathology with interest in distance education and diagnostic activities; the Department of Health Care and Epidemiology with interest in creating diagnostic guidelines, as well as interactive diagnostic activities.
 - The Affiliated University Teaching Hospitals have an interest in diagnostic advice as consultants to periphery.

Other Potential Program Applications

- 1) RCN-Northwest Alberta (will liaise with University of Calgary and University of Alberta initiatives): A project to network rural communities in northwest Alberta (Rainbow Lake, High Level, Fort Vermilion, La Crate, Grande Prairie) with Edmonton and Calgary.

Goal: To improve access to primary health services within the region; increase access to specialist consultations outside the region; assist in stabilizing the physician population through university affiliation; reduce patient and physician travel; potentially reduce the need for some emergency transportation; and to allow provision of continuous and comprehensive primary health services within the region, regardless of the level of physician supply.

A cost analysis has estimated the net benefit for the first operational year of such a program to be approximately \$62,000.00.

- 2) Faculty of Medicine, University of Calgary initiative. PMAC/MRC/Faculty of Medicine, University of Calgary Clinical Trials Network
Industry/PMAC/MRC--interested in commitment (contact person: Dr. Steve Edworthy, Department of Medicine, Faculty of Medicine, University of Calgary)
- Advances in health care research rely considerably on cooperative efforts in multi-centre trials. The inception of ideas, development of research protocols, and clarification of issues on an ongoing basis all require excellent communication between centres. An ATM link between academic units would facilitate the effective and efficient use of resources for the purpose of developing and conducting clinical trials. The savings in travel time alone would be of great benefit to researchers and sponsors from the pharmaceutical community. The ability to coordinate more extensive efforts, with sharing of data and expertise, would also be greatly facilitated. The academic community and the pharmaceutical industry would become more competitive in the world market, both in terms of the ideas generated as well as the products available. The Canadian citizen will benefit through quicker access to appropriate therapeutic interventions.

- 3) The Alberta Health Knowledge Network (AHKN) is a development initiative sponsored by the University of Alberta and the University of Calgary with developmental support from AGT Ltd. and CDP Technologies of New York. Specifically, the network

will provide improved access for researchers and practitioners to the major electronic databases in health care and cognate disciplines. The AHKN will comprise the installation of computer hardware and bibliographic searching software, supported by an infrastructure centred between the two university libraries.

VII. PROMOTION & MARKETING ACTIVITIES/POTENTIAL ECONOMIC RETURNS

The liaison between health and private industry provides a built-in mechanism to insure optimal promotion and marketing of the products. Partners from the health industry have well-established respective linkages into the health and government environments. They are aware of the potential needs and benefits that telemedicine systems can bring to all targeted health industry audiences. Private industry partners have strong proven marketing, sales, and service infrastructures in place. The Telemedicine Western Connection is positioned to maximize health promotion savings and revenue generation because of the blend of partnership it has.

Promotion and Marketing Audiences

Within the Health Industry

- | | |
|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| • Faculties of Medicine | • Health Care Researchers |
| • Hospitals/Health Care Centres | • Senior Administrators in the Health Training Areas |
| - Tertiary Care | • Research Assistants and Graduate Students |
| - Community | • National and Provincial Governments |
| - Regional | • Other Insurance Companies |
| - Rural/Remote | • Other Institutions Interested in Purchasing Related Telemedicine Capabilities (Private clinics, health care facilities within federal and provincial correctional services, etc.) |
| • Administrative Hospital Boards and Administrators | |
| • Health Care Providers or Givers | |
| • Future Health Care Professionals | |
| • Regional, Rural, and Remote Communities | |
| • Patient/Health Consumers | |

Within Private Industry

- Canadian Telephone Operating Companies
 - will profit from monthly rates for carriers and for long distance charges
- Vendors for parts of the Telemedicine Package
 - e.g. hardware, software, equipment attachments such as cameras, sound systems, microphones, monitors, fax machines, fax modems, printers
- Special Medical Equipment Attachments
 - e.g. stethoscope, laparoscopic connection capabilities, etc.
- Service/Maintenance Companies
 - to provide service and maintenance for the system

- Training Companies
 - to provide technical training and clinical training; and to prepare training materials

Promotion and Marketing Plan

Videos, brochures, clinical training, technical training manuals, and training sessions, have been drafted and/or trialed through pilot work at the University of Calgary Faculty of Medicine. These preliminary and pilot documents would be assets to the initial promotion, marketing, and sales plan associated with the Telemedicine Western Connection.

Promotion: Faculty and staff associated with the Faculties of Medicine and health institutions, have, and will continue to, promote the telemedicine initiative at international, national, provincial, regional, and local health care, academic, and research conferences. In addition, they will continue to work with the national medical education boards, provincial licensing boards, provincial medical associations, and national and provincial governments regarding this initiative. Promotion will also be ongoing through invited poster sessions, demonstrations, presentations, and ongoing publications. Drs. Watanabe, Jennett (leaders of this initiative), and associated clinical colleagues have already extensively networked with all the noted health industry targeted audiences noted above. Dr. Watanabe is a distinguished clinician, researcher, academician, and administrator in the health field. He is the past Dean of the Faculty of Medicine, University of Calgary, and is well networked at the international, North American, Canadian, and Alberta levels. Dr. Jennett is part of senior administration at the Faculty of Medicine, University of Calgary. She is a well known researcher in the health care and educational areas, and completed doctoral work in the area of medical education. She also is well networked internationally, nationally, and provincially (see Appendix D).

Marketing: The Alberta Health Industry has annual expenditures of over \$6 billion. Over \$300 million of that is currently spent on information technology. Private industry partners are well positioned to insure extensive marketing exercises occur, as marketing plans and sales forces are routine elements of their infrastructures.

AGT Limited, who are committing \$90,000 and \$10,000 (in-kind), has already exercised plans for this activity. Claire Ingles, Director, Health Industry Marketing, AGT Ltd., and Gwen Kenderdine, Senior Business Analyst, Health Marketing, AGT Ltd. have taken the lead for marketing. For Alberta, environmental assessments, a situational analysis (market, size, segmentation, and contacts), market goals and objectives, along with strategies and initiatives are being considered. They estimate the Alberta market for telemedicine systems to be approximately \$10-15 million annually. The potential revenue is expected to consist of the following: System sales (up front) 70%; After sales market (ongoing) 30%.

AGT is specifically positioned for marketing and sales:

- AGT takes corporate social responsibility very seriously. AGT President, Don Lowry, served as 1993 Chair of the United Way Campaign for Alberta, AGT sponsors many local and provincial events (eg. the 1992 Winter Olympics in Calgary, Feathercare with the Alberta Forestry, Lands and Wildlife department, Distinguished Visitors program at the University of Calgary), AGT has a very active recycling campaign including directory recycling.
- AGT will provide high level marketing support through established relationships with Alberta health facilities and stakeholders. eg. AGT Board members are members of Alberta Health Facility Boards (eg. Caritas Health Group in Edmonton covering 3 acute care facilities with 4500 employees), AGT Health Marketing Group participates in Strategic Planning with key stakeholders including the AMA, Alberta Health, Alberta Research Council, Think Tank of National Health Industry Leaders (at invitation of Deputy Minister), etc.
- AGT is a recognized industry leader in promotion with many international awards in commercial design and production dating back to the 1960's. These include 1993 Gold Award for Best TV Commercial produced in Canada, 1993 TVB Award, 1992 Bronze and Silver for TV Singles at Houston, Texas Worldfest, 1990 TorStar Best Recruitment Ad Award, CLIO finalist, etc.
- AGT is part of the Stentor Alliance of Canadian telcos and is being funded by Stentor for national health marketing, specifically evaluating and developing a market plan for the national roll out of telemedicine.
- AGT is part of the Marketing Information Center activity with Stentor. This multi million dollar system is specifically tasked with tracking and reporting on competitive activity. AGT Health Marketing is developing a Health Information Management System (HIMS) scheduled for completion in April, 1994 to be used to track information from the Marketing Information Center, sales leads and other sources.
- AGT has established alliances with key players in the Alberta and Canadian market. eg. with ISM-A (a subsidiary of IBM and AGT), the largest systems management company in Alberta; Motorola; MobiLink; Bellcore; MCI; Bell Atlantic and, of course, with the major Canadian telcos: Bell Canada, BCTel, SaskTel, MTS, NBTel/Bruncor, NewTel Enterprises, MT&T and Island Tel.
- AGT has developed extensive distribution channels within Alberta. eg. for cost effective directory and direct mail delivery, sales channels such as Radio Shack and Future Shop. AGT reaches into almost every home and business in Alberta.

Sales: AGT sales force consists of approximately 150 personnel (in addition to a telemarketing force of over 100 personnel). This sales force has between 2 and 14 years experience with an average experience level of about 7 years. The force has been extensively trained in relationship selling (eg. Holden Stage 4) which is required in the Health Industry. In addition, established relationships (eg. Stage 4) exist with all health facilities in the province, either directly or, in the city of Edmonton, through EdTel.

AGT sales force is sectorized by industry. The Government, Health and Education sector of AGT sales force consists of approximately 40 personnel. The number of AGT personnel dedicated to the health industry will be largely determined by revenues.

However, initially 4 health industry experts will be targeted toward selling systems related to this telemedicine initiative.

I&R: AGT has extensive installation and repair personnel (1500-2000) trained on the maintenance and installation of a wide variety of supplier equipment and facilities. These personnel are located throughout the province.

VIII. ASSESSMENT OF TECHNICAL AND FINANCIAL RISKS

Given health care reform and economic realities which are re-shaping the health care system, it is difficult to ignore this initiative which addresses questions of rapid and equal access, costs, rationalization, and leading edge competitiveness within health care programs.

Low Risks

- This initiative requires the partnership of health industry, system manufacturers and telco companies. All are in place.
- Very initial trials and marketing and sales plans have indicated that systems would be viable, feasible, and helpful to the health system.
- Competitors with equivalent capabilities with respect to designing and implementing telemedicine systems, within current estimated cost categories have been ruled out at present by AGT for the province of Alberta. VTEL, MTI/CLI, Picture Tel System 4000, and Stentor Alliance vendors have initially been reviewed.

Items Which Would Interfere with Initiative Implementation

- Emerging competitors. This is being closely monitored.
- Health, telcos, and system developers unable to work together. The commitment of \$490,000.00 up front by initiative partners suggests this will not happen.
- Change in health care directions and needs. These have been monitored closely and projected to satisfy current and future health directions, beyond the year 2000.
- Change in health care policies. The current changes in health care reform and economic realities are being shaped by health care policy and other factors; therefore, it is not likely health care policy will interfere with such initiatives.

IX. QUALIFICATIONS OF PROJECT DIRECTORS/KEY PARTNERS TO DATE

i) Dr. Mo Watanabe, Professor of Medicine, and Dr. Penny Jennett, Associate Professor, Faculty of Medicine, The University of Calgary, are the RCN Western Connection project Directors/Coordinators. They are uniquely qualified to pursue this task. They possess the required clinical, policy and evaluation/research expertise and experience; as well they are established recognized professionals, scholars and academics in their respective fields. Drs. Watanabe and Jennett also have well established linkages with needed additional clinical epidemiological and technical expertise to assist them in

this task. To indicate the magnitude of their involvement in the area of telemedicine applications, in the past 6 months alone, they have provided 12 international, national, provincial and local presentations, posters, publications and seminars in the area. They are also closely networked with all proposed Western collaborative program sites. Each program has an identified contact person who will be the investigator/clinician responsible for the specific program (Appendix D).

The University of Calgary is a dynamic research and teaching university of growing national and international stature, with 16 faculties and more than 60 academic departments or major program areas. Virtually all faculty members engage in research, scholarship and creative activity. The University of Calgary's Faculty of Medicine assumes a leadership role in all of these areas.

The Faculty collaborates with all of the major hospitals in the community in both education and research, including Foothills Hospital, Tom Baker Cancer Centre [Alberta Cancer Board], Calgary General Hospital, Alberta Children's Hospital and the Calgary District Hospital Group. Our referral area encompasses approximately 1.5 million people throughout southern Alberta, south-eastern British Columbia, south-western Saskatchewan and into Montana.

ii) AGT is a \$3 billion (assets) telecommunications company with over 7000 employees located in most urban centres in Alberta. TELUS, the AGT parent company, is a publicly traded company listed on the Toronto Stock Exchange. Specifically, it is one of the 35 companies that make up the TSE Index (the 35 most actively traded stocks in Canada).

AGT has a long history in the Alberta market, starting in the early 1900s with a clear commitment to the people and businesses of Alberta. AGT is the primary supplier to telecommunications in Alberta. Its affiliates, AGT Mobility and AGT Directory, are the major providers of cellular and directory services to the Alberta market. Through TELUS, AGT has ownership positions in satellite and CATV enterprises.

AGT remains firmly committed to the Alberta market.

iii) Silicon Graphics Canada has been in business for 10 years and employs approximately 60 people in five different Canadian cities. SGI sales are now in excess of \$40 million and it has partnerships with a number of Canadian companies including Alias Research, Softimage, Discrete Logic and others. Canadian customers include universities, the National Research Council, Bell Northern Research, Northern Telecom and the Banff Centre. David Synnott, Branch Manager, Western Canada, is the contact person for this initiative.

iv) IBM Canada Ltd. is a well established systems developer currently involved in a number of very successful telemedicine-related products. They could bring to the project, IBM professional services, project technical resources, and hardware and

software. Monica Sawchyn, Account Manager, IBM Canada Ltd., will serve as our contact.

APPENDIX A

I. Letters of Commitment:

i. Health Industry Partners

1. Faculty of Medicine, University of Calgary - Dr. E. R. Smith, Dean
2. Faculty of Medicine, University of Alberta - Dr. D. R. Wilson, Dean
3. College of Medicine, The University of Saskatchewan - Dr. D. R. Popkin, Dean
4. Faculty of Medicine, The University of Manitoba - Dr. B. W. Kirk, Associate Dean (Academic)
5. Faculty of Medicine, The University of British Columbia - Dr. D. F. Hardwick, Associate Dean, Research & Planning
6. Foothills Hospital - Dr. L. E. Bryan, President
- Supplementary Letter - John A. King, Vice-President, Planning and Corporate Services
7. Calgary General Hospital - Ms. Marlene Meyers, President

ii. Private Industry Partners

1. AGT Limited
2. Silicon Graphics
3. IBM (Exploring nature of relationship)

II. Letter Indicating Possible Liaison

1. Siemens Electric Limited

III. Anticipated Letter of Working Relationship

1. Hughes Aircraft Canada
2. Hughes Aircraft Company



THE
UNIVERSITY
OF CALGARY

Health Sciences Centre

3330 Hospital Drive N.W., Calgary, Alberta, Canada T2N 4N1

Faculty of MEDICINE
DEAN'S OFFICE

Telephone (403) 220-6843

1993-11-24

Dr. Mo Watanabe
Department of Medicine
Faculty of Medicine
University of Calgary
3330 Hospital Drive N.W.
Calgary, Alberta
T2N 4N1

Dear Dr. Watanabe:

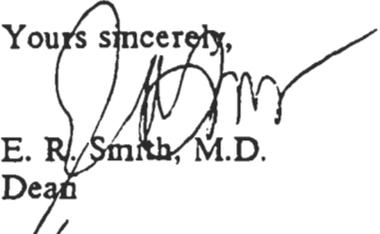
Re: Health WurcNet Partnership Proposal - Remote Consultative Network

The Faculty of Medicine, University of Calgary, is interested in participating in the Health WurcNet Partnership Proposal. Please accept this communication as a letter of support for involvement.

The Faculty has been actively involved for the past nine months in a pilot project between Drumheller Regional Health Complex and the Faculty of Medicine. This pilot provided professional (elective, urgent, and emergent), and technical (e.g., ultrasound, fetal monitoring, EKG/EEG, electronic stethoscopic, funduscopy, microscopic images, laboratory and x-ray) consultations, real-time and off-line for patients in the Drumheller rural catchment area by two-way computerized integrated video technology. This consultative service is known as the Remote Consultative Network (RCN). The RCN has been developed through a three-member partnership: the Faculty of Medicine at the University of Calgary, Hughes Aircraft, and AGT Limited.

Based upon feedback from the pilot, we are now excited about the possibility of broadening the RCN applications as described in this proposal. To this end, the Faculty of Medicine, University of Calgary, will commit \$75,000.

Yours sincerely,



E. R. Smith, M.D.
Dean

ERS:kpb



DEAN OF MEDICINE

UNIVERSITY OF SASKATCHEWAN

FAXED
 24 NOV 93

 ROOM 8103
 HEALTH SCIENCES BUILDING
 SASKATOON, CANADA
 S7N 0W0
 Phone: (306) 966-4133
 FAX: (306) 966-4144

 Rec. File No. 571.30
300.10

November 24, 1993

Penny Jennett, Ph.D.
 Director, Office of Medical Education
 Faculty of Medicine, Health Sciences Centre
 The University of Calgary
 3330 Hospital Drive NW
 Calgary, Alberta
 T2N 4N1

Dear Dr. Jennett:

RE: WurcNet/CANARIE Proposal

In response to the WurcNet proposal, the College of Medicine, University of Saskatchewan, is fully in agreement with the need for a rural/remote consultation network and is very interested in becoming a part of it. We see numerous applications of the network within Saskatchewan, particularly in light of the long distances some patients must travel for specialist care and in light of our College extending its teaching into non-urban sites. We are also supportive of the research questions about health care delivery posed in the proposal.

As a start, we envision connections between the Royal University Hospital in Saskatoon (the major teaching hospital of the College of Medicine) and two external teaching sites, Ile-à-la-Crosse (remote) and Melfort (rural). The estimated cost of three connections plus wiring, training, and centrex service would be \$450,000. In addition, the College would consider contributing service in-kind in terms of a central-site coordinator, a project evaluator, and the medical expertise of specialists and sub-specialists.

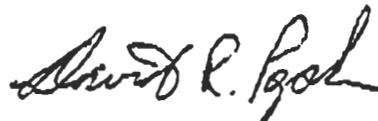
As noted, the thrust of our interest is patient care, a responsibility that involves more than the College of Medicine alone. It encompasses the Saskatchewan Department of Health, the medical profession, district health boards, allied health services, and the public – in other words, the whole health care sector. I have initiated discussions with the government and the medical profession about WurcNet but need more time to discuss its operation so that benefits will be optimal, responsibilities shared, and jurisdictions respected.

...../2

Penny Jemett, Ph.D.
November 24, 1993
Page 2

The financial circumstances of the University of Saskatchewan at present are such that we cannot commit a specific dollar amount to WuroNet at this time. However, as noted, negotiations are underway and, should they prove successful, we may be in a position by the next planning phase to commit funds in principle to this promising venture.

Yours sincerely,



D.R. Popkin, M.D.
Dean
College of Medicine

DRP/dls

cc: Dr. M. Watanabe

NOV 23 1993



THE UNIVERSITY OF MANITOBA

FACULTY OF MEDICINE
Office of the Dean

753 McDermot Avenue
Winnipeg Manitoba
Canada R3E 0W3

Tel.: (204) 789-3557

FAX: (204) 789-3489

November 18, 1993

Dr. Penny Jennett
Director, Office of Medical Education
Faculty of Medicine
University of Calgary
Calgary, Alberta

Dear Dr. Jennett:

Re: WurcNet Partnership Proposal

The Faculty of Medicine, University of Manitoba is interested in participating in the WurcNet Health Partnership Proposal. We do not have enough information at this point to make a formal commitment.

In our view there are two rather separate areas of opportunity in the WurcNet proposal.

The first is inter-provincial a) with opportunities for high speed data transmission of very large blocks of data such as those used by Les and Nora Lou Roos, and b) the opportunity for inter-university teaching such as departmental rounds, lectures, etc. We are very interested in this.

The second is the remote consultative network proposal. In Manitoba we have two northern remote sites, Thompson (provincially funded) and Churchill (federally funded). Both generate enormous costs in air transport to Winnipeg for diagnosis and treatment. Both the provincial and the federal governments have shown great interest in the provision of specialty services to these sites.

I have spoken to Mr. Frank DeCock, Executive Director of Manitoba Health Services Commission. He is very enthusiastic about the notion of providing remote consultation in Manitoba. Of course, a lot of work must be done before there is a firm commitment.

With respect to the site at Churchill, the federal authorities have committed funds to Dr. Lyons to provide some remote radiology consultation services.

I also spoke to Nancy Lane who is in charge of video technology here at the University. Their department has been approached with similar ideas.

Obviously this is an idea which is now technically feasible. In the brief time available I have found a great deal of interest and enthusiasm, particularly so at the possibility of 50/50 cost sharing through the CANARIE grant.

We will need more information to develop a budget. Money is very tight here so it depends on the amount and the time frame. We do have interested people with expertise and equipment.

I will be away from November 19 to December 2. If you need more information, please call Dr. Ted Lyons at (204) 787-1328.

Sincerely,



B.W. Kirk, M.D., FRCPC
Associate Dean (Academic)

Copies to: Dr. N. Anthonisen
 Dr. E. Lyons
 Ms. N. Lane

THE UNIVERSITY OF BRITISH COLUMBIA



Faculty of Medicine
317 - 2194 Health Sciences Mall
Vancouver, B.C. Canada V6T 1Z3

Tel: (604) 822-2421

Fax: (604) 822-6061

Deans Office

October 28, 1993

Dr. Mo Watanabe
Faculty of Medicine
University of Calgary
3330 Hospital Drive N.W.
Calgary, Alberta T2N 4N1

Dear Dr. Watanabe:

Re: Consultative Diagnostic Network (CANARIE)

The University of British Columbia has a number of individuals interested in diagnostic consultative activities by distance. In addition, among the teaching hospitals there exists a diagnostic and information fibre optic highway that could be further exploited for this purpose.

In the Department of Family Practice there is enthusiastic interest in this activity both in the Vancouver locus and also in the distant areas, particularly in Nanaimo. The Department of Pathology has shown considerable interest in distance education and diagnostic activities and will be involved in trials regarding this between Victoria and Vancouver through the BC Children's Hospital. The Department of Health Care and Epidemiology similarly has interest in creating diagnostic guidelines as well as interactive diagnostic activities.

The affiliated University teaching hospitals similarly have interest in diagnostic advice as consultants to periphery. Listed below for you are the names of a number of contact individuals in these specific areas. This list is by no means comprehensive but represents those people who have come to my attention who could be consulted regarding both hardware and software aspects of such a proposal.

I trust that this brief outline sketch meets your current needs. Should there be necessity for convening a committee to review this at the University and to activate proposals, please let me know.

Dr. David Haydorn, Department of Health Care and Epidemiology
c/o Centre for Health Services and Policy Research
University of British Columbia
P.A. Woodward Instructional Resources Centre, Room 429
2194 Health Sciences Mall, Vancouver, BC V6T 1Z3

Dr. Carl Whiteside, Department of Family Practice
Fairmont Family Practice Unit
Vancouver General Hospital
855 West 10th Avenue, Vancouver, BC V6Z 1M9

Dr. James E. Dimmick, Department of Pathology
BC Children's Hospital
4480 Oak Street, Vancouver, BC V6H 3V4

Mr. Tim Hoffman, Information Services
Vancouver General Hospital, UBC Site
2211 Wesbrook Mall, Vancouver, BC V6T 2B5

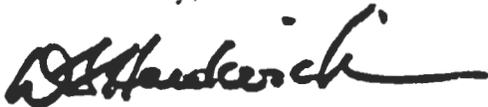
Dr. David Matheson, Vice President, Medical Administration
BC Children's Hospital
4480 Oak Street, Vancouver, BC V6H 3V4

Dr. Charles Wright, Vice President, Medical and Academic Affairs
Vancouver General Hospital
855 West 10th Avenue, Vancouver, BC V6Z 1M9

Dr. Tom Ward, Vice President
St. Paul's Hospital
1081 Burrard Street, Vancouver, BC V5Z 1Y6

Dr. David Klassen, Director
BC Cancer Agency
600 West 10th Avenue, Vancouver, BC V5Z 4E6

Yours sincerely,



David F. Hardwick, MD, FRCPC
Associate Dean, Research and Planning



Foothills Hospital

1403 - 29 St. N.W.
CALGARY, ALBERTA T2N 2T9
(403) 670-1110

October 29, 1993

Dr. M. Watanabe
Faculty of Medicine
University of Calgary

Dear Dr. Watanabe:

RE: Health WURCNET Partnership Proposal - Remote Consultative Network

The purpose of this letter is to provide the enthusiastic support of Foothills Hospital to the Remote Consultative Network and your proposal. Foothills Hospital represents the major tertiary care facility for southern Alberta and is a full partner with the Faculty of Medicine, University of Calgary and the Alberta Cancer Boards, Tom Baker Centre in the provision of health research, education and health policy development. With the anticipated reorganization of health resources in Alberta it is likely the already significant regional role at Foothills Hospital will increase in the future. We see the Remote Consultative Network as a key component of our current and future role.

We have several regional programs already in existence but are in the process of planning a highly integrated program for cerebral vascular disease (stroke). This represents the third leading cause of death in Canada. The integrated nature of this program would entail the recruitment of strategic partners to provide the various components such as prevention, home care, rehabilitation, long term care, public education, provider education, health evaluation and basic research. In order to make this highly integrated program function it will be essential to have a Remote Consultative Process in place principally for the use of patient assessment and diagnosis and initial optimization of treatment but also to allow consultation to occur among the various partners of the program.

I have concentrated on the role of the RCN in the Stroke Program but obviously in our situation as a tertiary care site we provide a large amount of consultation to rural and small urban centers. The opportunity to have this done on site provides a wide opportunity to enhance the quality of care and reduce excessive utilization of resources through dissemination of guidelines by the Remote Consultative Network and by the prevention of needless transfers to higher cost institutions like our own.

Ultimately we will be willing to provide financial resources to support the RCN and would be happy to discuss those in detail once plans are more finalized concerning the Remote Consultative Network and a better understanding of the funding base that you and your colleagues will have in place.

October 29, 1993
Page Two

Thank you for the opportunity to participate in this very exciting future oriented project.

Yours sincerely,

A handwritten signature in cursive script, appearing to read "L.E. Bryan".

L.E. Bryan, M.D., Ph.D.
President

LEB/adz

c:\a\10002910



Foothills Hospital

1403 - 29 St. N.W.
CALGARY, ALBERTA T2N 2T9
(403) 670-1110

February 22, 1994

Dr. Penny Jennett
Associate Professor
Director, Office of Medical Education
Faculty of Medicine
University of Calgary
Health Sciences Centre
Calgary, Alberta

Dear Penny:

**RE: REMOTE CONSULTATIVE NETWORK - HEALTH WURCNET
PARTNERSHIP PROPOSAL**

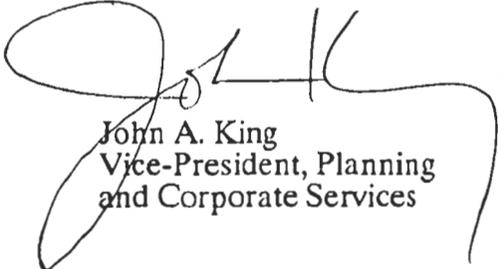
Further to our discussion of last week, I would like to reconfirm our support of the above project. I have also been able to contact the regional hospitals to ascertain interest in this project.

Dr. Bryan and I believe it is fair to comment that in principle, we would require four units for installation at the Foothills, Lethbridge Regional, Red Deer and Medicine Hat Hospitals. These hospitals are unable to commit funds at this time, however, it may be fair to assume that they could be responsible for up to one-half of the costs.

Over the next week, I will attempt to receive a firm commitment from these organizations. In the meantime, you can document support in principle. The Foothills Hospital's commitment is as presented by Dr. Bryan earlier in these discussions.

I trust this information is of interest to you. Dr. Bryan did want me to confirm our enthusiastic support of this project. I will forward information to you once I receive it from the regional hospitals.

Yours sincerely,
FOOTHILLS HOSPITAL



John A. King
Vice-President, Planning
and Corporate Services

wlc
c.c.

Dr. L. Bryan



**The Calgary
General Hospital**
Bow Valley Centre
Peter Lougheed Centre

Bow Valley Centre of
The Calgary General Hospital
841 Centre Avenue E.
Calgary, Alberta T2E 0A1
Tel. (403) 268-9111
Fax (403) 268-9222

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FAXED
93/11/25

Office of the President

1993 November 25

Dr. M. Watanabe
Professor,
Department of Medicine
Faculty of Medicine
University of Calgary
Health Sciences Centre
3330 Hospital Drive, N.W.
Calgary, Alberta
T2N 4N1

Dear Dr. Watanabe:

We have considered your request for support of the remote consultative network. The purpose of this letter is to indicate our support for this concept and approval in principle to fund the work unit and a limited number of years of operating costs, on the understanding that matching funds will be available from Canarie.

Obviously this approval is contingent upon what may happen during the regional discussion and funding changes now under way.

If you require further information regarding the commitment of The Calgary General Hospital to this project, please get in touch with me. We look forward to working with you on this exciting venture!

Yours truly,

Marlene Meyers
President and Chief Executive Officer

MM/dlb

c: Dr. T. Rosenal, Director, Intensive Care

c:\data\text\uoofc\canarie.ltr





Claire Ingles
Director, Health Industry Marketing
AGT Ltd.
20A, 10020-100th Street
Edmonton, Alberta
T5J 0N5

February 22, 1994

Dean Eldon Smith
Faculty of Medicine
University of Calgary
3330 Hospital Drive NW
Calgary, Alberta
T2N 4N1

Re: WURCnet Proposal on RCN

AGT Ltd. sees definite commercial value in developing applications to stimulate use of a broadband network in Canada. The RCN requires an ATM network with multipoint, multicast and bridging capability such as that provided by WURCnet for the Continuing Medical Education (CME), Videoconferencing and Specialist consultation broadband applications. As such, we support the Remote Consultative Network (RCN) proposal from the U of C and are willing to develop the network architecture standards and plans necessary to support medical imaging and video transfer on the AGT network. AGT is prepared to commit \$90,000 plus \$10,000 in kind for this purpose.

Regards,

A handwritten signature in black ink, appearing to read "Claire Ingles", written over a horizontal line.

cc: Dr. Penny Jonnett, Faculty of Medicine
John Webb, SVP-Marketing

* Telemedicine Network Initiative



SiliconGraphics
Computer Systems

14th Flr 311-6th Avenue SW
Calgary, Alberta T2P 3H2
Telephone (403) 269-8844
FAX (403) 269-6105

February 25, 1994

Health Sciences Centre
3330 Hospital Drive N.W.
Calgary, Alberta
T2N 4N1

Attention: Dr. Penny Jennett

Dear Dr. Jennett

We, at Silicon Graphics, wish to thank you for the opportunity to participate in the Remote Consultative Network project bid in conjunction with the Health Sciences Centre. The possibilities for utilizing state-of-the-art technology to enhance medical consultation and communications in the province are definitely exciting to our organization, and we are pleased to participate in this joint venture.

This letter is a commitment to offer the project participants the benefit of utilizing our technology with substantially lower acquisition costs than normally incurred by Health Care facilities in Canada. Specifically, I will offer reductions 15-25% beyond standard, for purchases related to this project.

Further, as an indication of our commitment to the success of the initiative, the Western Canadian Branch of Silicon Graphics will negotiate a mutually agreeable cash donation with the Health Sciences Centre, subject to the approval of the project by CANARIE.

It is our belief that the desktop teleconferencing, visualization, and high communication bandwidth requirements for the project are areas in which Silicon Graphics excels, and that our participation will position S.G.I. as a key technology partner. Since all of our technology is based on Industry standards, the project results will be deployable on all technologies which adhere to open system standards.

I look forward to a mutually beneficial result.

Yours sincerely,

David Synnott
Branch Manager, Western Canada



IBM Canada Ltd.

10250 - 101 Street
Edmonton, Alberta
T5J 3P4
(403) 421-5600

Dr. P. Jennett
Faculty of Medicine
Office of Medical Education
Health Sciences Centre
The University of Calgary
3330 Hospital Drive N.W.
Calgary, Alberta
T2N 4N1

February 25, 1994

Dear Penny

Thank you for the opportunity to participate in your WURCNET Remote Consultative Network (RCN) project. IBM believes that there is tremendous market potential for this kind of initiative and is currently involved in a number of very successful telemedicine related projects.

We look forward to working with you to investigate IBM's participation in the RCN project and the many potential benefits for Alberta's Health Care System. Our involvement, subject to our mutual agreement, could include the following:

- o IBM Professional Services
- o Project Technical Resources
- o Hardware and Software.

We value the opportunity to work with you, and the members of WURCNET and look forward to a successful project and ongoing partnership.

Yours truly

Monica A. Sawchyn, P. Eng.
Account Manager
IBM Canada Ltd.
(403) 421-5654

SIEMENS

FACSIMILE TRANSMISSION

RECEIVER DETAILS

TO: GWEN KENDERDINE ...
 COMPANY: A G T
 LOCATION: EDMONTON
 FAX NUMBER: 493-3115
 DATE: February 25, 1994

SENDER DETAILS

FROM: Bert Stadler ...
 DEPARTMENT: Medical
 LOCATION: Edmonton
 FAX NUMBER: (403) 450-6553
 # OF PAGES TO FOLLOW:

Dear Ms Kenderdine:

Thank you for your call yesterday. Siemens is very active in medical imaging networking. As I mentioned to you Siemens has imaging work-stations available today which we use within PACS networks. (PACS -Picture-Archiving and Communication System)

In principle, Siemens would be interested to work with you if the hardware/software we have available or in development is suitable with the intended network you are planning.

Yours very truly,

Siemens Electric Limited
 Medical Systems Division



Bert Stadler, Regional Manager
 Western Canada

APPENDIX B

Specific University of Calgary Faculty of Medicine Network Budget

REMOTE CONSULTATIVE NETWORK BUDGET PROPOSAL

PERSONNEL	1993-94	1994-95	1995-96	Notes
Project Evaluator (1.0FTE)				1
Salary	\$40,000.00	\$41,000.00	\$42,025.00	
Benefits (16%)	\$6,400.00	\$6,560.00	\$6,724.00	
Sub total	\$46,400.00	\$47,560.00	\$48,749.00	
Central Site RN Coordinator				2
Salary (.25FTE)	\$10,000.00	\$10,250.00	\$10,506.25	
Benefits (16%)	\$1,600.00	\$1,640.00	\$1,681.00	
Sub total	\$11,600.00	\$11,890.00	\$12,187.25	
Central Site Clinical Coordinator				3
Salary (per hour)	\$48.50	\$49.71	\$50.96	
Total hours per year	312 (6 per week)	416 (8 per week)	520 (10 per week)	
Sub total	\$15,132.00	\$20,176.00	\$25,850.50	
Central Site Secretary (1.0 FTE)				
Salary	\$22,780.00	\$23,349.50	\$23,933.24	
Benefits (16%)	\$3,645.00	\$3,736.13	\$3,829.53	
Sub total	\$26,425.00	\$27,085.63	\$27,762.77	
Remote Site				
Remote Site Clinical Coordinator				
Salary (per hour)	\$48.50	\$49.71	\$51.70	
Total hours per year	156 (3 per week)	260 (5 per week)	364 (7 per week)	
Sub Total	\$7,566.00	\$12,610.00	\$18,095.35	
Remote Site RN Coordinator				
Salary (.5 FTE)	\$20,000.00	\$20,500.00	\$21,012.50	
Benefits (16%)	\$3,200.00	\$3,280.00	\$3,362.00	
Sub Total	\$23,200.00	\$23,780.00	\$24,374.50	
Sub total Central Site Salary	\$99,557.00	\$106,711.63	\$114,549.52	
Sub total Remote Site Salary	\$30,766.00	\$36,390.00	\$42,469.85	
Sub Total Salary Costs	\$130,323.00	\$143,101.63	\$157,019.37	

REMOTE CONSULTATIVE NETWORK BUDGET PROPOSAL

SUPPLIES/EQUIPMENT	1993-94	1994-95	1995-96	Notes
Capital				
Personal Computers				
Data analysis and evaluation system	\$3,000.00	\$0.00	\$0.00	
Word processing system	\$1,800.00	\$0.00	\$0.00	
Laser Printer (shared)	\$1,250.00	\$0.00	\$0.00	
Facsimile Machine	\$1,000.00	\$0.00	\$0.00	
Sub total	\$7,050.00	\$0.00	\$0.00	
Operating (10)				
Centrex phone line rental (7 lines)	\$301.00	\$301.00	\$301.00	4
Total minutes of usage per year	6720	11200	14000	5
Average rate per minute	\$0.30	\$0.28	\$0.26	6
Toll charges for consultation	\$2,016.00	\$3,136.00	\$3,640.00	
Maintenance	\$1,400.00	\$1,400.00	\$1,400.00	7
Computer disks/storage media	\$200.00	\$205.00	\$210.13	
Paper/office supplies	\$1,750.00	\$1,793.75	\$1,838.59	
Cellular phone (System access)	\$300.00	\$307.50	\$315.19	8
Cellular phone charges	\$120.00	\$123.00	\$126.08	
Pager access	\$540.00	\$553.50	\$567.34	9
Software licenses (statistical/word processing)	\$600.00	\$615.00	\$630.38	
Courier charges	\$500.00	\$512.50	\$525.31	
Telephone charges (local/ long distance/fax)	\$600.00	\$615.00	\$630.38	
Association membership fees	\$375.00	\$375.00	\$375.00	
Journal subscriptions	\$425.00	\$425.00	\$425.00	
Sub Total	\$9,127.00	\$10,362.25	\$10,984.38	
Travel				
Remote site visits				
280km @ \$.25 per km	\$70.00	\$71.75	\$73.54	
15 Visits	\$1,050.00	\$1,076.25	\$1,103.16	
Conferences (Two per year)	\$3,500.00	\$3,587.50	\$3,677.19	
Continuing education	\$500.00	\$512.50	\$525.31	
Miscellaneous	\$500.00	\$512.50	\$525.31	
Sub total	\$5,120.00	\$5,248.00	\$5,379.20	
Operating total	\$14,247.00	\$15,610.25	\$16,363.58	
Operating and Capital Total	\$21,297.00	\$15,610.25	\$16,363.58	

APPENDIX C

Evaluation Approach and Research Questions

EVALUATION APPROACH AND RESEARCH QUESTIONS

A pilot project between Drumheller Regional Health Complex and the Faculty of Medicine, The University of Calgary was initiated in April of 1992.

The 12-month pilot offered real-time audio, video, image, and data transmission capabilities. Professional (elective, urgent, and emergent), and technical (e.g., ultrasound, fetal monitoring, EKG/EEG, electronic stethoscopic, funduscopy, microscopic images, laboratory, and x-ray) consultations were provided real-time and off-line for patients in rural and remote areas by two-way computerized video integrated technology. Together in real-time specialist, sub-specialists, rural practitioners, and other health care providers were able to interview and examine patients, discuss patients' diagnoses, investigations and management options and consider pathological and laboratory information.

Evaluation

The impact, effectiveness, and cost of this alternative approach to providing specialty consultations was assessed in the pilot. Information with respect to the impact of encounters was collected by interview from seven sources: patients, remote site health care providers, specialty consultants, site coordinators, administrators/policy makers, other system users (education), and research team members. Specific data were collected regarding: patient health status, impact on health care delivery (process), impact on practitioners (remote and consultants), administrative/policy making issues, health care costs, and utilizations effects, diagnostic and management approaches if the network had not been in place, impact on education, technological issues and other. Out-of-pocket expenditures, production loss of work, patient pain and suffering, and patient health care delivery preferences were elements considered.

Results

Immediate benefits of the RCN included real-time second opinions for remote site physicians and health care providers, reduced time required for diagnosis, investigation, and treatment decisions, increased care delivered at the remote site (potential for increased continuity of primary and specialty care), decreased patient travel, reduced need for emergency transportation, and greater access to continuing education for professionals. In addition, the teleconference consultation system was well received by patients, and family and specialty care givers. As well, cost savings were related to care being delivered at the local site.

As this pilot has just been completed, the technology and applications are now ready for broader application and field testing.

Sample Research Questions Appropriate for the Telemedicine Western Connection

Can the telemedicine technology assist the health care reform process by ensuring the maintenance of access to health care services and expertise during the rationalization process?

Can this technology decrease the need for health care providers and duplication of resources?

Can this technology improve the health status of the community?

Can this technology decrease health care costs and provide more cost-effective health care?

Can this technology induce health care providers to work cooperatively and collaboratively for the benefit of patient care?

APPENDIX D

Curriculum Vitae

Dr. Penny Jennett

**CURRICULUM VITAE
FOR
PENNY ANNETTE JENNETT**

I. BIOGRAPHICAL DATA

**Penny Annette Jennett
48 Edgebrook Circle N.W.
Calgary, Alberta T3A 5A2
(403) 239-7698**

**Born January 27, 1946
Canadian Citizen**

**Associate Professor
Office of Medical Education & Department of Community Health Sciences
Director, Office of Medical Education
Faculty of Medicine
University of Calgary**

II. ACADEMIC RECORD

**Ph.D., Administration and Curriculum, Medical Education
1982
Michigan State University, East Lansing, Michigan, USA**

**M.A., Medical Education
1980
Michigan State University, East Lansing, Michigan, USA**

**B.A. (with distinction), Department of Psychology
1977
University of Saskatchewan, Canada**

**Registered Medical Record Librarian (Health Record Administrator)
CCHRA(C), Canadian Registration Exam
1965
Canadian College of Health Record Administrators**

**Medical Record Librarian
1965
Regina Grey Nun's School for Medical Librarians,
Regina Grey Nun's Hospital, Regina, Saskatchewan, Canada**

III. AWARDS AND DISTINCTIONS

Nominee for CAME Award, November 1993

Certificate of Recognition, The Research Committee of The Society of Medical College Directors In Continuing Medical Education. One of 3 (1 Canadian, 2 American) research papers selected for presentation at the 1986 Annual Spring Meeting, May 4, 1986, Montreal, Quebec, Canada

Medical Scholarship-Canadian Life and Health Insurance Association, Inc.
\$75,000, 1982

Honour Society of Phi Kappa Phi, 1981 to present - life membership

Doctoral Fellowship Award Holder, Social Sciences and Humanities Research Council of Canada, 1980 to 1982

Undergraduate Scholarship, Psychology-Honours Program, 1974; 1977

Saskatchewan Government Scholarship, High School Completion, 1963

Local Community Scholarship, Public School Completion, Dinsmore, Saskatchewan, 1959

IV. ACADEMIC APPOINTMENT(S)

Associate Professor, 1989 to present, Office of Medical Education and Community Health Sciences, Faculty of Medicine, University of Calgary, Calgary, Alberta

Assistant Professor, 1987-1989, Department of Community Health Sciences, Faculty of Medicine, University of Calgary, Calgary, Alberta

Assistant Professor, 1985-1989, Office of Medical Education, Faculty of Medicine, University of Calgary, Calgary, Alberta

Clinical Assistant Professor, 1982-1985, Division of Continuing Medical Education, University of Saskatchewan, Saskatoon, Saskatchewan

Research Associate, 1982-1985, Division of Continuing Medical Education, University of Saskatchewan, Saskatoon, Saskatchewan

Curriculum Vitae - Penny Annette Jennett, Ph.D.

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**Doctoral Fellow, Office of Medical Education Research and Development,
College of Human Medicine, Michigan State University, 1980 to 1982**

**Masters Fellow, Office of Medical Education Research and Development,
College of Human Medicine, Michigan State University, 1979 to 1980**

**Graduate Assistant, Office of Medical Education Research and Development,
College of Human Medicine, Michigan State University, 1979 to 1982**

**Research Assistant, Division of Continuing Medical Education, University of
Saskatchewan, July 1980; August 1981 (Summers)**

**Data Reviewer and Analyst, "A Survey of Continuing Medical Education in
Saskatchewan 1978-79 (Opinions, Preferences, Participation and
Recommendations)," random survey results of 171 Saskatchewan registered
medical doctors, University of Saskatchewan, 1980**

**Regional Health Record Administrator, Correctional Service of Canada, Prairie
Region, 1977 to 1979**

**Coordinator of Quality Assurance Program, Division of Continuing Medical
Education, April 1977 to October 1977 (6-month project)**

**Coordinator, Therapeutics Project, Research Assistant, Quality Assurance
Program, Division of Continuing Medical Education, Saskatoon, 1974 to 1977
(3-year research project)**

**Medical Record Abstractor, Hysterectomy Study, College of Physicians and
Surgeons of Saskatchewan, May 1974 to September 1974 (summer)**

**Supervisor of Medical Record Services, North Bay Psychiatric Hospital North
Bay, Ontario, 1971 to 1974**

Chief Medical Record Librarian, Saskatoon City Hospital, 1967 to 1971

**Staff Medical Record Librarian and Assistant Chief Medical Record Librarian,
Saskatoon University Hospital, 1965 to 1967**

V. EDUCATIONAL ACTIVITIES

Teaching Record:

Faculty of Medicine, University of Calgary, Calgary, Alberta

Adult Learning as Applied to Health Professional Education, MDSC 755.72,
Directed Study, Coordinator and instructor, 1 student, 40 hours, Fall 1993.

Teaching Methods in the Medical Sciences, MDSC 731.01, Organizer and
instructor for Spring 1993.

Teaching Methods in the Medical Sciences, MDSC 731.01, Organizer and
instructor for Fall 1992.

Curriculum Design and Evaluation in the Medical Sciences, MDSC 731.02,
Organizer and instructor for Spring 1992.

Adult Learning as Applied to Health Professional Education, MDSC 755.72,
Self Study, Organizer and instructor for Winter 1992.

Teaching Methods in the Medical Sciences, MDSC 731.01, Organizer and
instructor for Fall 1991.

Horizontal Theme Manager, Medical Informatics Unit, May 1990 to July 1993.

Small group leader with Dr. T. Rosenal, Planning and Prevention Course,
MDCN 321, October 31 and November 7, 1990.

Unit Manager, Planning and Prevention Course, MDCN 321, October 1990 to
present.

Introduction to Medical Informatics, Component of Principles for Medicine
Course, MDCN 302, 1990 to present.

"How to Teach and Speak in Public", Graduate Student Seminar, September 10,
1990.

Curriculum Design and Evaluation in the Medical Sciences, MDSC 731.02,
Organizer and instructor for Spring 1990.

Curriculum Vitae - Penny Annette Jennett, Ph.D.

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"Teaching Strategies in Adult Education", Diabetes Centre, Department of Medicine, Calgary General Hospital, April 27, 1990.

"Tips for Effective Lecturing", Faculty development workshop, Faculty of Medicine, University of Calgary, April 3 & 4, 1990.

"Research Idea Workshop", Faculty development workshop, Faculty of Medicine, University of Calgary, March 13, 1990.

Special Series of 4 fall seminars offered in Teaching Methods in the Medical Sciences, Fall, 1989.

Jennett, PA. Peri-Natal Follow-Up Program, Alberta Children's Hospital, "Optimizing the Case Conference", November 27, 1989.

Jennett, PA. Inservice Resource Centre, Calgary General Hospital, Peter Lougheed Centre--"Teaching Tips for Inservice Coordinators", October 20, 1989.

Curriculum Design and Evaluation in the Medical Sciences, MDSC 731.02, Organizer and instructor for Winter 1989.

Teaching Methods in the Medical Sciences, MDSC 731.01, Organizer and instructor for Winter, 1988.

Curriculum Design and Evaluation in the Medical Sciences, MDSC 731.02, Organizer and instructor for Winter 1988.

Teaching Methods in the Medical Sciences, MDSC 731.01, Organizer and instructor for Fall 1988.

Multi-Station Examinations for general, orthopaedic and plastic surgery residents--November, 1988.

Internal Medicine Retreat--Measurement of Competence in the 1990's--October, 1988.

Multi-Station Workshop for Residents--Presenter of station with psychiatrists, Drs. Williams and Lamarre--March, 1988.

Introductory Course, MDCN 302, Problem Solving, Fall Term, 1987.

Curriculum Vitae - Penny Annette Jennett, Ph.D.

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Teaching Methods in the Medical Sciences, Fall term, 1986, and Spring Term, 1987; co-instructor with Dr. L. Fisher.

Curriculum Design and Evaluation, Winter and Fall terms 1986, and Spring term, 1987; co-instructor with Dr. L. Fisher.

Supervisor--6-week elective for Resident in Internal Medicine. Topic--Medical Education, May and June, 1987.

Supervisor--December 1987 for faculty member on sabbatical.
Topic--Grantsmanship.

Seminar series on Methods to Measure Physician (Student Physician) Competence - "Aspects of competence that could be approached through Chart Review", April 23, 1986, Medical Education Discussion and Study Group, Dean's Conference Room, Faculty of Medicine, Calgary.

College of Medicine, University of Saskatchewan, Saskatoon, Saskatchewan

Small Group Teaching Seminar for Faculty, October 1984 - Teacher and Organizer

CAUCE Western Regional Conference - Professional Continuing Education Program - April 12, 1984; Chaired by Dr. O. E. Laxdal, College of Medicine, University of Saskatchewan; Assisted by Dr. Penny Jennett, College of Medicine, University of Saskatchewan

Faculty Instructional Development Seminar - March 10, 1984.

Nominal Group Process. Chaired by Dr. Jim Spooner, Assistant Dean (Undergraduate Education and Student Affairs), College of Medicine, University of Saskatchewan; Assisted by Dr. Penny Jennett, College of Medicine, University of Saskatchewan

Medical Student Undergraduate Class - Research - Spring, 1983. Invited participant, College of Medicine, University of Saskatchewan

THESIS/ELECTIVE/FACULTY SUPERVISOR/ADVISOR:

External examiner, Carole L. Rush, Educational Policy and Administrative Studies, July 8, 1993.

Master's Supervisor, Dr. Alexander Shysh, January 1993 to present

Elective advisor, Nancy Byles, M.D. student, December 1992 to present

Master's Supervisor, Dr. Robert J. Perlau, September 1992 to March 1993

Elective Advisor to one undergraduate medical student, Fall 1991 to May 1992

Faculty advisor to two undergraduate medical students, Fall 1989 to May 1991

Elective advisor to one undergraduate medical student, 1988 to May 1991

Master's supervisor, Carol Bischoff, Spring 1990 to July 1992

External Examiner, Rhiannon Edwards, M.A. (Economics) candidate, Spring 1990

Member, Master's Supervisory Committee, Gwyneth Meyers, 1988 to 1990.

Member, Master's Supervisory Committee, Krista Brown, 1987 to 1989.

Member, Master's Supervisory Committee, Elizabeth Eaton, 1987 to 1989.

External Examiner, Jim Aikman, M.Ec., April 1987

Member of Master's Thesis Committee, 1983-84. Continuing Education, College of Education, University of Saskatchewan

VI. ADMINISTRATIVE RESPONSIBILITIES

i. DEPARTMENTAL:

Faculty of Medicine, University of Calgary, Calgary, Alberta

Director, Office of Medical Education, July 1991 to present.

Chairman, Medical Education Research Group, February 1990 to September 1992, December 1992 to present

Editor, OME/MERG Newsletter, 1991 to present

Member, Planning Group II, Undergraduate Medical Education, as required

Consultant to all areas of Medical Education across the continuum.

ii. **FACULTY:**

Chair, Medical Education Research Group, 1990 to present

Chair, Employment Equity Task Force, 1993

Member, Task Force Subcommittee on Educational Program Leading to M.D. Degree (Accreditation 1993), October 1992 to May 1993

Member, Task Force Subcommittee on Research (Accreditation 1993), October 1992 to May 1993

Member, Task Force Subcommittee on Resources (Accreditation 1993), October 1992 to May 1993

Member, Biochemistry Headship Review Committee, November 1992 to November 1993

Member, APD (Appointments, Promotions, Dismissals) Subcommittee, December 1992 to present

Faculty of Medicine Representative and Member, Network for Health Research (NHR), 1992 to present

Member, Medical Education Committee, 1993 to present

Member, Pain Research Group, 1992 to present

Member, M.D./Advanced Degree Program Committee, 1992 to present

Member, Women in the Nineties Subcommittee, 1994 to present

Chair, Women in the Nineties Subcommittee, February to July 1992

Member, Internal Medicine Residency Information Project, 1992 to present

Member, Student Promotions Committee, Faculty of Medicine, July 1990 to June 1992, July 1993 to present

Curriculum Vitae - Penny Annette Jennett, Ph.D.

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Representative, Executive Faculty Council, Faculty of Medicine, July 1990 to June 1992

Member, Women Faculty Group, 1992 to present

Member, M.D. Continuum Committee, 1991 to present

Member, Rural Initiatives Committee, 1991 to September 1992

Member, Group for the Evaluation of Medical Software, Faculty of Medicine, 1990 to present

Member, Internal Medicine Residency Information Study Group, 1991 to present

Member, Educational Resource Committee, Faculty of Medicine, 1989 to present

Member and consultant, Planning Group II (second year medical school exams), Faculty of Medicine, 1986 to 1988, 1990 to present

Member, Nominating Committee, Faculty of Medicine, July 1989 to June 1991

Chairman, Sub-Committee of Curriculum Committee to develop horizontal theme in Medical Informatics in the Undergraduate Program, 1989

Member, Curriculum Committee, Faculty of Medicine, September 1987 to July 1989

Chairman/Organizer and Member, Medical Education Discussion and Study Group, (10 presentations organized annually), 1986 to February 1990

Member, Faculty of Medicine Student Appeals Committee, September, 1987 to June 1988

Member, Special Projects Review Committee--Integrative Course Review, May 1988 to December 1988

All data analyses for review of curriculum sections of M.D. follow-up survey data for Drs. J. Baumber and L. Fisher, Spring 1988

Faculty Development Protocol, Curriculum Committee, Faculty of Medicine, June 1988

Curriculum Vitae - Penny Annette Jennett, Ph.D.

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Member, Planning Group II, Faculty of Medicine, 1987 to June 1988

Project Director and Member, Calgary Resident Research Study Group,
Faculty of Medicine, Fall 1986 to 1988

Member, Calgary M.D. Study Group, Faculty of Medicine, December 1985 to
June 1988

Member, Department of Medicine--AD HOC Committee to review the
educational program, Faculty of Medicine, January-October, 1987

Member, Integrative Evaluation Committee, Faculty of Medicine, Winter
1986/87, Spring 1987

Chairperson of Planning Committee, September-November, 1987. Two-day
Visiting Lecturer, Dr. Ian Hart, Ottawa. Clinical Competence Assessment

Supervisor--Summer Student(s); Office of Medical Education, 1987, 1988 (2),
1989, 1990 (2)

Supervisor--Research Assistant, Office of Medical Education, 1986 to present

Supervisor--Research Assistant Trainee, November 1987 to May 1988 and
September 1988 to present

College of Medicine, University of Saskatchewan, Saskatoon, Saskatchewan

Post Graduate Clinical Education Committee - Research Methodology for
Residents. 1984

Organizer and C.M.E. Planning Committee Member - Royal College of
Physicians and Surgeons of Canada. November, 1984 - Special Lecture - Dr.
David Sackett, McMaster University, Hamilton, Ontario

Organizer and C.M.E. Planning Committee Member - Royal College of
Physicians and Surgeons of Canada. May, 1983. - Special Lecture - Dr. John
Williamson, The Johns Hopkins University, Baltimore, Maryland

Open House Committee, College of Medicine, Member, 1982

Organizer and C.M.E. Planning Committee Member - Quality Assurance Workshop, Continuing Medical Education, College of Medicine, University of Saskatchewan, Saskatoon, Saskatchewan, 1976

iii. UNIVERSITY:

Faculty of Medicine, University of Calgary, Calgary, Alberta

University representative to Confederation of Alberta Faculty Associations Conference on Post-Secondary Education and Technology in Alberta, February 1993.

Member, Teaching Development Office Review Committee, 1993

Member, Teaching Development Advisory Committee, 1992 to present

Member, Information Services Futures Focus Group, 1992 to present

Faculty of Medicine Representative to General Faculties Council, July 1989 to June 1992

Faculty of Medicine Representative to the Faculty of Education, July 1986 to June 1988; July 1992 to present

VII. PROFESSIONAL ACTIVITIES

i. Memberships

Member, Board of Directors, WurcNet, Inc., 1994 to present.

Member, Network for Health Research, 1992 to present

Member, American Educational Research Association, 1992 to present

Member, American Medical Informatics Association, 1990 to present

Member, External Advisory Committee for Physician Manpower, 1991 to January 1992

Member, Society of Directors of Research in Medical Education, 1989 to present

Curriculum Vitae - Penny Annette Jennett, Ph.D.

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Member, Ad hoc committee to identify CME research ideas, Society of Medical College Directors of Research in Medical Education, 1992 to present

Member, Society of Medical College Directors of Continuing Medical Education, 1989 to present

Member, ACMC Standing Committee on Continuing Medical Education (SCCME) and the SCCME sub-committee on research in CME. 1984 to 1986; 1989 to present

Life Member, The Honour Society of Phi Kappa Phi, 1982 to present

Member, Canadian Evaluation Society, 1988 to present

Member, Association for the Study of Medical Education, Dundee, Scotland, 1987 to present

Member, Canadian Association for Medical Education (CAME), 1987 to present; member of executive board, 1990 to 1992.

Member, Canadian College of Health Record Administrators - Canadian Health Record Association, 1965 to present

Member, Alberta Health Record Association, 1986 to present

Council Representative for Manitoba and Saskatchewan, The Canadian College of Health Record Administrators, 1975 to 1977

Co-Convener, Canadian Annual Conference, The Canadian Health Record Association, 1975

Regional Chairman, The Ontario Health Record Association, 1973

Vice-President, 1967; Treasurer, 1966; Provincial Delegate to National Mid-Year Meeting, 1967; Convener of Annual Provincial Convention, 1967; The Saskatchewan Health Record Association

Past Memberships:

Member, Saskatchewan Health Record Association, 1965 to 1986

Member, ACMC Standing Committee on Continuing Medical Education (SCCME) and the SCCME sub-committee on research in CME. 1984 to 1986

Member, Credentials and Education Committee, Canadian College of Health Record Administrators, Canadian Health Record Association, 1983 to 1986

Member, Research in Continuing Medical Education (RICME) Planning Committee, 1984. San Francisco, California. (First Conference on RICME)

The Ontario Health Record Association

ii. Professional service:

Director and Representative, WURCNET, Inc. (Western University Research Consortium on High Performance Computing and Networking), 1994 to present.

Member, WURCNET Steering Committee, (Western University Research Consortium on High Performance Computing and Networking), 1993 to present

Chair, Association of Canadian Medical Colleges Research Committee, April 1993 to present

Member, Editorial Board, Canadian Medical Informatics Journal, 1993 to present

Member, Ad hoc committee to identify CME research ideas, Society of Medical College Directors of Research in Medical Education, 1993

Co-Chair, Association of Canadian Medical Colleges Research Committee, April 1992 to April 1993

University of Calgary Women's Liaison Officer, Association of American Medical Colleges, 1991 to present

Reviewer, NHRDP, 1992 to present

Reviewer, University of British Columbia, Centre for Health Promotion, 1992 to present

Reviewer, Association of Canadian Medical Colleges Committee, Special Resources Committee on Research in Medical Education, 1990 to present

Reviewer, *Teaching and Learning in Medicine*, Spring 1990 to present

Reviewer, *Canadian Medical Association Journal*, 1987 to present

Reviewer of RIME papers and symposia for the Research in Medical Education Conference, Association of American Medical Colleges, 1990-1992

Reviewer, Ontario Ministry of Health, Health Care Research Competitions, 1990 to present

Reviewer, Manitoba Health Research Council, April 1991

Reviewer, Hannah Institute for the History of Medicine, 1991

Reviewer, Faculty of Medicine Ethics Committee, 1987 to present

Reviewer, Socio-Health Review Committee Saskatchewan Health Research Board, January 1985 to 1986

VIII. RESEARCH SUPPORT

FUNDED:

Dr. Scholl Foundation; Principal Investigator--The Contribution of Physician Management Practices to Drug-Related Illness in the Elderly. \$15,000, December 1993 to December 1994.

The University of Calgary Faculty of Medicine Endowment Fund--McGill/Calgary Study Addressing the Use of Drugs in the Elderly. \$10,000, July 1993.

University Research Grants Committee, University of Calgary; \$1,320 Travel grant to attend and present paper at The First International Conference on Medical Aspects of Telemedicine, Tromsø, Norway, May 20-22, 1993.

Alberta Family Life and Substance Abuse Foundation; Parboosingh J, Lockyer J, Juschka B, Drought J, Gromoff B, Jennett P, el-Guebaly N, Chang S, Weston A, Campbell B. Detection and Management of Alcohol Abuse in Family Practice. \$122,000, November 1992 to October 1994.

Brooks Community Health Unit; Swanson R, Jennett P, Hagen N, and Flynn P. A Community-based Chronic Pain Education Project. \$50,500, November 1993 to May 1995.

The University of Calgary; Watanabe M, Swanson RW, and Jennett PA.
Evaluation of Remote Consultative Network. \$90,000, March 1993 to February 1995.

Merck Frosst Canada; Dr. Scholl Foundation; APMC Research Grant;
University of Calgary Research Grants (x2); \$100,500, Principal Investigator,
Calgary--The Contribution of Physician Management Practices to Drug-Related
Illness in the Elderly (collaborative study with McGill University)--May 1991 to
May 1994.

The Calgary Foundation, College of Physicians & Surgeons of Alberta,
University of Calgary Faculty of Medicine, and Alberta Health--\$40,000.00,
Principal Investigator--A Study of Factors Contributing to Variation in Alberta
Health Care Costs Resulting From Patients Being Cared for by Family
Physicians in the Ambulatory Setting--January 15, 1990 to December 31, 1991.

Association of Canadian Medical Colleges, Committee on Research in Medical
Education--\$3,500.00, Co-investigator with Jocelyn Lockyer, principal
investigator--Can Practice-Based Questions be Used to Focus CME Programs
on the Educational Needs of Physicians?--November 1990 to May, 1991.

Foothills Hospital--\$5,000.00, Co-investigator with Barbara Fenwick, principal
investigator--Telephone Follow-up Post-Myocardial Infarction and Post
Coronary Artery Bypass Surgery (Pilot Study)--September 1990 to January
1991.

The University of Calgary Research Grants Award--\$1,500.00--Peer Review in
Residency Programs--May, 1989 to November, 1990.

Royal College of Physicians and Surgeons Regional Advisory Committee I--
\$1,200.00--for visiting lecturer Dr. Stephen B. Soumerai, October 31, 1990.

MSI Foundation of Alberta--\$27,332.72, Principal Investigator--A Medical
Information System for Physicians in Rural Practice--December 1988 to
December 31, 1989.

Health and Welfare Canada, NHRDP--\$238,352.50, Co-Investigator with Dr.
Wayne Elford, principal investigator--Coronary Risk Reduction--December
1988 to December 1992.

Alberta Heritage Foundation Visiting Lecturer--Dr. Ian Hart--
-\$1,398.00--November 1987.

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Medical Council of Canada, Q4 Project Executive Committee--Co-investigator with Dr. Peter Harasym, principal investigator--The Effects of Question Format on a New Q4 Examination Designed to Assess Clinical Reasoning--\$31,400.00--July 1987.

MSI Foundation--\$35,275.00, M.D. Graduate Follow-up Study-- September, 1986.

Jointly with Dr. J. S. Baumber--\$2,500.00, Special Projects Fund, The University of Calgary, August 1986.

Jointly with Dr. J. S. Baumber--The Study of the Competence of Graduates from Canadian Medical Schools - Workshop, \$5,000.00, Alberta Heritage Foundation for Medical Research, May 14 & 15, 1986.

Jointly with O.E. Laxdal, \$9,000.00, Saskatchewan Heart Foundation, College of Medicine, University of Saskatchewan, 1985-86.

Jointly with O.E. Laxdal, \$71,525.00, Health and Welfare, Canada. College of Medicine, University of Saskatchewan, 1984-85; 1985-86.

Grant-in-Aid-Research Grant, \$18,500.00, Saskatchewan Health Research Board, College of Medicine, University of Saskatchewan, 1983.

Medical Scholarship, \$75,000.00, Canadian Life and Health Insurance Association Inc., College of Medicine, University of Saskatchewan, 1982.

Grant-in-Aid-Research Grant, \$12,000.00, Saskatchewan Health Research Board, College of Medicine, University of Saskatchewan, 1982.

Jointly with O.E. Laxdal, \$34,300.00, Health and Welfare, College of Medicine, University of Saskatchewan, 1982.

FUNDED INTERNALLY:

Internal Medicine Residency Information Study--An Assessment of the Information Needs of R1 and Senior Residents on a Medical Teaching Unit Rotation. Rosenal T, Edworthy S, VanRosendaal G, Jennett P, Powrie R, and Kryski A.

IX. INVITED ADDRESSES

Jennett PA. "Teaching/Training Skills". Workshop for the Canadian Health Record Libraries Association Annual Conference, June 13, 1993.

Jennett PA, Swanson RW, Watanabe M. "Remote Consultative Network". The First International Conference on Medical Aspects of Telemedicine, Tromso, Norway, May 1993.

Swanson RW, Hall WB, Jennett PA. "Perceptions of Educational/Marketing Functions and Degree of Influence of Pharmaceutical Representations: A Comparison Between Industry Representative and Family Physicians: A Pilot Study Presented to the 34th National Annual Scientific Assembly, The College of Family Physicians of Canada, Halifax, May 1993.

Jennett PA. "What's in a Question?". Workshop for Association of Canadian Medical Colleges Committee on CME, April 26, 1993.

Jennett PA. "How to do Research on Dissemination", Workshop presented at Symposia on Foundation of Primary Care Research, Toronto, Feb. 3-5, 1993.

Jennett PA. "A Glimpse at Research Activities in Medical Education". Society of Directors of Research in Medical Education, November 9, 1992.

Jennett PA. "Principles of Giving Feedback" (Presented twice). Spring Seeding (A symposium for rural preceptors sponsored by the Department of Family Medicine of the University of Alberta, and Alberta Health through the Rural Physician Action Plan), Edmonton, Alberta, June 13, 1992.

"Identifying Educational Needs for Curricula and Physicians in Practice: A Comparison of Methods". CAME workshop, ACMC Annual Meeting, April 1992, co-presenter: Dr. R. W. Swanson.

Jennett PA. "Life Long Self-Directed Learning: A Critical Ingredient of Medicine as a Profession". Keynote address to the Learning in Medicine Conference, Oslo, Norway, May 12-18, 1991.

Jennett PA. "What Do We Know About Self-Directed Learning?" Workshop presented at the Learning in Medicine Conference, Oslo, Norway, May 12-18, 1991.

Jennett PA. "Self-Directed Learning: A Pragmatic Approach". Research presentation by Dr. P. Jennett at SMCDCME Fall 1991 Program, AAMC, Washington, D.C., November 10, 1991.

Jennett PA. "Instructional Methods Workshop", Section of Teachers of Family Medicine Annual Workshop, November 7-9, 1991.

Jennett PA. Project consultancy, Section of Teachers of Family Medicine Annual Workshop, November 7-9, 1991. (Two private consultations)

Jennett PA. Discussant and Participant, Family Medicine Clerkship Workshop, Banff, Alberta, October 25 & 26, 1991

Jennett PA. Problem-Based Learning Seminar to Reproduction Group, Calgary, September 25, 1991

Jennett PA. "Characteristics of Self-Directed Learning". Workshop presented at Consensus Building Workshop, Beaver Creek, Colorado, July 27-31, 1991.

Jennett PA. "Consumer Use of Office Health Care: Facts and Implications". Presented by Dr. P. Jennett to Utilization Committee, Alberta Health, May 31, 1991.

Jennett PA. "Chart Stimulated Recall". Seminar presented at McGill University, February 27, 1991.

"Assessing CME Programs in Cardiovascular Disease and Cancer". Presented to the Second Conference on Research in Continuing Medical Education, Montreal, Quebec, May 2-3, 1986. Authors: Jennett P, Laxdal O, Hayton R, Klaassen R, Mainprize G, Swanson R, Wilson T, Spooner J and Wickett R.

X. PUBLICATIONS/PRESENTATIONS:

A. PUBLICATIONS

i. Peer reviewed manuscripts

Submitted:

Hogan DB, Campbell NRC, Crutcher R, Jennett P, and MacLeod N. "Prescription of Non-steroidal Anti-inflammatory Drugs for Albertan Seniors". Submitted to *Canadian Medical Association Journal*, November 1993.

Elford RW, Yeo M, Jennett PA, and Sawa RJ. "Preventive Cardiology: Beyond Risk Assessment". Submitted to *Archives of Family Medicine*, September 1993.

Jennett P. "Chart Stimulated Recall: A Technique to Assess Clinical Competence and Performance". Submitted to *Postgraduate Education for General Practice*, May 1993 (Invited)

Accepted:

Swanson RW, Hall WG, and Jennett PA. "The Perceptions of Pharmaceutical Representatives and Family Physicians Regarding Educational and Marketing Functions of Pharmaceutical Representatives' Visits". Accepted by *Academic Medicine*, October 1993.

Jennett PA, Swanson RW. "Traditional and New Approaches to CME: Perceptions of a Variety of CME Activities--A National Survey". Accepted by *Journal of Continuing Education in the Health Professions*, October 1993.

Jennett PA, Swanson RW. "Life-Long, Self Directed Learning: Why Physicians and Educators Should Be Interested". Accepted by *Journal of Continuing Education in the Health Professions*, October 1993.

Van Rosendaal GMA and Jennett P. "Peer Evaluation in an Internal Medicine Residency". Accepted by *Academic Medicine*, April 1993.

Published:

Jennett PA, Crelinsten GL, and Kinsella TD. "Advanced Training in Biomedical Ethics: A Curriculum for Trainees in Clinical Specialty Programs". *Medical Education*, 27(6):484-488, 1993.

Jennett PA and Swanson RW. "Life Long Self-Directed Learning: An Essential Ingredient to the Practice of Medicine". *Saskatchewan Medical Journal*, 4(3):8-9, 1993.

Jennett PA. "Self-Directed Learning: A Pragmatic View". *Journal of Continuing Education in the Health Professions*, 12(2):99-104, 1992.

Jennett PA, Elford RW, Sawa RJ, Smith SE. "Factors that Influence Family Physicians' Practice Decisions Regarding Health Promotion". *Journal of Continuing Education in the Health Professions*. 12(1):39-48, 1992.

Swanson RW, Jennett PA. "Formal CME Course Content Observations Before and After Needs Assessment. *Journal of Continuing Education in the Health Professions*. 12(4):11-15, 1992.

Jennett PA, Kishinevsky M, Parboosingh IJT, Lockyer JM, Maes WR.
"Responses to Non-Emergency Questions in Rural Medicine: Their Usefulness to Practice Decisions". *Medical Education*, 25:238-243, 1991.

Jennett PA, Dunlop WE, Nixon J, Kishinevsky M, and Harasym PH. "Clinical Competence Assessment in Surgical Residency: A Comparison of Assessment Methods Through First-Hand Perspectives". *Annals RCPSC*, 24(4):204-206, 1991.

Jennett PA, Edworthy SM, Rosenal T, Maes WR, Yee N, and Jardine PG.
"Preparing doctors for tomorrow: information management as a theme in undergraduate medical education". *Medical Education*, 25:135-139, 1991.

Sawa RJ, Jennett P, Elford RW. "Reducing the Risk of Coronary Artery Disease". *Canadian Family Physician*, 37:651-654, 1991.

Bryant H, Jennett PA, and Kishinevsky M. "Gender Influences on Medical Professional Activity: A consideration of Change." *Academic Medicine*, 66(8), 483-485, 1991.

Jennett PA, Parboosingh IJ, Maes WR, Lockyer JM and Lawson D. "A medical information networking system between practitioners and academia: its role in the maintenance of competence". *The Journal of Continuing Education in the Health Professions*, 10(3):237-243, 1990.

Jennett PA, Hunter KL, and Baumber JS. "Medical School Graduates' Activities in Research and Teaching: Alberta Medical Schools 1973 to 1985". *Teaching and Learning in Medicine*, 2(1):20-24, 1990.

Jennett PA, Kishinevsky M, Hunter KE, and Akinsanya S. "Practice Locations of Physicians: Relationships to Place of Residency, Medical School and 'Home' Province". *Annals RCPSC*, 23(3):271-273, 1990.

Jennett PA, Kishinevsky M, Bryant H, and Hunter KL. "Major Medical Career Changes Following Medical School Graduation: When, How Often, and Why". *Academic Medicine*, 65(1):48-49, 1990.

Jennett PA, Wilson TW, Hayton RC, Mainprize GW, Laxdal OE. "Desirable Behaviours in the Office Management of Hypertension Addressed Through Continuing Medical Education". *Canadian Public Health Journal*, 80(5):359-362, 1989.

Jennett PA, Lockyer JM, Parboosingh IJT, and Maes WR. "Practice-Generated Questions: A Method of Formulating True Learning Needs of Family Physicians". *Canadian Family Physician*, 35:497-500, 1989.

Jennett PA, Jasinski DJ, Hunter KL. "Graduate clinical training--The reasons for choosing and timing of the choice at the University of Calgary". *Annals RCPSC*, 22(6):427-430, 1989.

McDougall GM and Jennett PA. "The Maintenance of Professional Competence: The Cart Before the Horse?" *Annals RCPSC*, 22(5):300, 1989.

Jennett PA and Hunter KL. "Career and practice profiles of Alberta medical graduates 1973-85. Implications for manpower planning and decision making". *Canadian Medical Association Journal*, 139(7): 625-628, 1988.

Jennett PA, Laxdal OE, Hayton RC, Klaassen DJ, Swanson RW, Wilson TW, Spooner HJ, Mainprize GW, Wickett REY. "The effects of C.M.E. upon family physician performance in office practice: a randomized controlled study". *Medical Education*, 22:139-145, 1988.

Jennett PA, Parboosingh IJT, Lockyer JM, Maes WR, Paul C. "A pilot study of a medical information system for family physicians in practice". *Journal of Medical Education*, 63:193-195, 1988.

Lockyer JM, Jennett PA, Parboosingh J, Maes W. "Raising questions in clinical practice". *The Journal of Continuing Education in the Health Professions*, 8:21-26, 1988.

Lockyer JM, Jennett PA, Parboosingh IJT, McDougall GM, Bryan G. "Family physician registration at locally produced short courses". *Canadian Medical Association Journal*, 139(12):1153-1155, 1988.

McDougall GM, Jennett PA, Hunter KE, Lockyer JM, Morrison DJ, Schachar NS, and Van Rosendaal GMA. "A collaborative longitudinal study of resident assessment (A comparative and predictive study)". *Clinical and Investigative Medicine (Suppl)*, 11(4), RCPSC Annual Meeting, September 23, 1988.

Jennett PA, Rothert ML, Rovner DR, Black NA and Elstein AS. "Subjective expected utility and referral decisions on obesity". *Methods of Information in Medicine*, 25(4), 1986.

Jennett PA, Spooner HJ, Wickett REY, Laxdal OE, Hayton RC, Klaassen DJ, Mainprize GW, Swanson RW, Wilson TW. "A special C.M.E. educational project". *MOBIUS*, October/November, 1986.

Jennett PA and Laxdal OE. "Assessing educational needs in medical practice - guidelines for the C.M.E. planning committee member". *Canadian Family Physician*, 30:1917-1922, 1984.

Jennett PA, Laxdal OE, Hayton RC, Klaassen DJ, Mainprize GW, Swanson RW, Wilson TW, Spooner HJ, Wickett REY, and Tan LK. "Designing educational interventions to improve physician performance in office practice". *MOBIUS*, 4(4):55-61, 1984.

Curry L and Jennett P. "Research priorities for continuing medical education: a Canadian perspective". *Canadian Medical Association Journal*, 131:723-724, 1984.

Ravitch MM, Rovner DR, Jennett PA, Rothert ML, Holmes MM, Holzman GB and Elstein AS. "A chart-audit study of referral of obese patients to endocrinologists". *Medical Decision Making*, 3(1):69-79, 1983.

Rovner DR, Ravitch MM, Rothert ML, Jennett PA, Holmes MM and Elstein AS. "Referral of obese patients to endocrinologists: A policy-capturing study of medical decision making". *Clinical Research*, 29:325a, 1981.

Davis ML and Jennett PA. "Safeguarding health rights of inmates". *Dimensions in Health Service*, 57(11):32-34, 1980.

Laxdal OE, Jennett PA, Wilson TW and Salisbury GM. "Improving physician performance by continuing medical education". *Canadian Medical Association Journal*, 118:1051-1058, 1978.

ii. Non-peer reviewed manuscripts

Jennett PA and Morin JE. "Remote Consultative Network Pilot Project. *INTERCOM*, July 1993.

Jennett PA and Aliaga DE. "The Adult Learner: A Neglected Species". Book review in *INTERCOM*, January 1993.

Jennett PA and Aliaga DE. "Qualitative Data Analysis: A Sourcebook of New Methods". Book review in *INTERCOM*, July 1992.

iii. Books, Chapters

Jennett P, Watanabe M, Hall W, Morin J, and Swanson R. "Remote Consultative Network--A Patient Contact Distance Consultative Service Using a Computerized Video Integrated Technology System". Redressing the Imbalance. In press.

Jennett PA. "How to do Research on Dissemination". In Dunn E (ed.) *Disseminating Research Findings and Having an Impact on Practice*. In Press.

Jennett PA, Jones D, Mast T, Egan K, Hotvedt M. "The Characteristics of Self-directed Learning". In Davis D and Fox R (eds.) *The Physician as Learner--Imbedding Research into Practice*. In press.

Jennett PA, Tambay JM, Atkinson MA, Baumber JS, Crutcher RA, Hogan DB, Elford RW, MacCannell KL and Swanson RW. "Chart Stimulated Recall: A Method for Assessing Factors Which Influence Physicians' Practice Performance". In Harden RM, Hart IR, and Mulholland H (eds.) *Approaches to the Assessment of Clinical Competence. Part 2*. Dundee: Centre for Medical Education, 1993.

Jones A, Jennett P, and Mandin H. "Importance of Student Feedback to Improve Bedside Preceptoring Skills". In Harden RM, Hart IR, and Mulholland H (eds.) *Approaches to the Assessment of Clinical Competence. Part 2*. Dundee: Centre for Medical Education, 1993.

Jennett PA, Cooper M, Edworthy S, Ohlhauser L, Brown M, Goldsand G and McDougall G. "Consumer Use of Office Health Care: Facts and Implications. In *Physicians in Canada: Proceedings of the Fourth and Fifth Physician Manpower Conference. Vol. III*. Ottawa: Association of Canadian Medical Colleges, 1993.

Jennett PA. "Life Long Self-Directed Learning: A Critical Ingredient of Medicine as a Profession". In Coles C and Holm A (eds.) *Learning in Medicine*. Oslo: Oslo University Press, 1993.

Jennett PA and Pearson TG. "Educational Responses to Practice-Based Learning: Recent Innovations in Medicine". In Baskett HK and Marsick VJ (eds.) *Professionals' Ways of Knowing: New Findings on How to Improve Professional Education*. Sources books New Directions for Continuing Education Vol. 55. San Francisco: Jossey-Bass, 1992.

Jennett PA, Parboosingh IJT, Maes WR, Lockyer JM. "Understanding the True Nature of Family Practice: Its Importance in the Maintenance of Competence". In Hart IR, Harden RM, and DesMarchais J. (eds.) *Current Development in Assessing Clinical Competence*. Montreal: Can-Heal Publications, Inc., 1992.

Jennett PA, Edworthy SM, Rosenal TW, Maes WR, Yee N, and Jardine PG. "Preparing our physicians for tomorrow--Information management as a theme in undergraduate medical education". In *Knowledge, Information and Medical Education*, J.H. Van Bommel and J. Zvárová, editors. Amsterdam: Elsevier Science Publishers B.V., 1991.

Jennett PA. *Changing and Learning in the Lives of Physicians*, by R.D. Fox, P.E. Mazmanian, and R. W. Putnam, in *Canadian Medical Association Journal*, 143(8):756, 1990. Also published in *Colleague*, a computer-assisted data retrieval service of BRS Colleague, 1990. (Invited book review)

Jennett PA, Spooner HJ, Wickett REY, Laxdal OE, Klaassen DJ, Swanson RW, Wilson TW, Mainprize GW. World Perspective on Adult Education. Illustrative Case. Continuing Professional Education. Canadian Chapter. Dr. Alan Knox and Dr. James A. Draper (eds.), University of Wisconsin Press, Madison, Wisconsin, 1988.

Ravitch MM, Rovner DR, Jennett PA, Holmes MM, Holzman GB, and Elstein AS. Decision Making in Primary Care: The Case of Obesity. In D.P. Connelly, E.S. Benson, M.D. Burke and D. Fenderson (eds.), *Clinical Decisions and Laboratory Use*, Chapter 7, 52- 58, Minneapolis: University of Minnesota Press, 1982.

iv. Presentations/Abstracts - published

Jennett P, Morin J, Watanabe M, Hall W, Olfert, L, and Swanson R. "The Evaluation of a Consultative Network Pilot Project". American Evaluation Society, Dallas, Texas, November 3-6, 1993.

Jennett PA, Tambay JM, Atkinson MA, Baumber JS, Crutcher RA, Hogan DB, Elford RW, MacCannell KL and Swanson RW. "The Office Management of Geriatric Patients with Osteoarthritis: Influencing Factors". Canadian Association on Gerontology 22nd Annual Scientific and Educational Meeting, Montreal, Quebec, October 29, 1993. Invited.

Hogan D, Jennett P, Campbell N, Crutcher R. and Swanson R. "Non-steroidal Anti-inflammatory Drug Use by Elderly Albertans". Canadian Association on Gerontology 22nd Annual Scientific and Educational Meeting, Montreal, Quebec, October 29, 1993. Invited.

Jennett P, Watanabe M, Hall W, Morin J, and Swanson R. "Remote Consultative Network--A Patient Contact Distance Consultative Service Using a Computerized Video Integrated Technology System". Redressing the Imbalance Conference, Thunder Bay, Ontario, October 21-24, 1993.

Rosenal TW, Jennett PA, Edworthy SM, Powrie R. and Kryski A. "Resident Information Sources: Books, Computers, or Colleagues?". Royal College of Physicians and Surgeons of Canada Annual Meeting, September 10, 1993.

Jennett PA, Swanson RW and Watanabe M. "Remote Consultative Network". The First International Conference on Medical Aspects of Telemedicine, Tromsø, Norway, May 1993.

Swanson RW, Hall WG, Jennett PA, "Perceptions of Educational/Marketing Functions and Degree of Influence of Pharmaceutical Representatives: A Comparison Between Industry Representatives and Family Physicians: A Pilot Study". College of Family Physicians of Canada, 34th National Annual Scientific Assembly, Halifax, N.S., May 13-15, 1993.

Jennett PA and Mann KV. "Sessions from Continuing Education Research for Undergraduate Medical Education". Association of American Medical Colleges Annual Meeting, November 9, 1992.

Jones A, Jennett P, Mandin H, and Harasym P. "An Instrument to Improve Clinical Teaching in an Undergraduate Clinical Skills Course". Presented by Dr. A. Jones at the Association of American Medical Colleges Annual Meeting, November 6-12, 1992.

Jennett PA, Tarrant M, Yee N, Edworthy S, Rosenal T, Hall D, and Grasa S. "Linking the Community Health Care Needs and Medical Training Programs Through Medical Informatics Applications". Presented by Dr. P. Jennett. ITCH '92 Conference on Information Technology and Community Health. Victoria, B.C., October 18-21, 1992.

Rosenal TW, Jennett PA, Edworthy SM, Hannah KJ, and Lucier, GE. "Development of a Tool to Evaluate Software for Medical Education". Presented by Dr. T. Rosenal. ITCH '92 Conference on Information Technology and Community Health. Victoria, B.C., October 18-21, 1992.

Jennett PA, Tambay JM, Atkinson MA, Baumber JS, Crutcher, RA, Hogan DB, Elford RW, MacCannell KL and Swanson RW. "Chart Stimulated Recall: A Method for Assessing Factors which Influence Physicians' Practice Performance". Presented by Dr. P. Jennett. Fifth Ottawa International Conference on Assessment of Clinical Competence. Dundee Scotland, September 1-3, 1992.

Jones A, Jennett P, and Mandin H. "Importance of Student Feedback to Improve Bedside Preceptoring Skills". Presented by Dr. A. Jones. Fifth Ottawa International Conference on Assessment of Clinical Competence. Dundee Scotland, September 1-3, 1992.

Jennett PA, McDougall GM, Russell ML, Schachar NS. "Relationship Between the Components of the Certification Process in Orthopaedic Surgery". Presented by Dr. N.S. Schachar at the Dewar Orthopaedic Society 34th Annual Meeting, London, Ontario, May 22 - 26, 1992.

Jennett PA and Swanson RW. "Identifying Educational Needs for Curricula and Physicians in Practice". Workshop presented at Association of Canadian Medical Colleges Annual Meeting, April 26-29, 1992.

Jennett PA, Baumber JS, Gromoff B, and Mandin H. "Multiple Uses of Simulated Patients". Workshop presented at Association of Canadian Medical Colleges Annual Meeting, April 26-29, 1992.

Eagle C, Jennett PA, and Mandin H. "Learning Issues Identified Using Standardized Patients in a Problem-Based Learning Course". In Engel C, Schmidt H, and Vluggen P. (eds) *Annals of Community-Oriented Education, Network of Community Oriented Educational Institutions for Health Sciences*, Maastricht, The Netherlands, 5:269-279, 1992.

Jennett PA, Sawa R, Elford W. "Qualitative Approaches to Examining Factors Which Can Assist Family Physicians in the Management of Patient Lifestyle Change in Coronary Artery Disease". International and Interdisciplinary Qualitative Health Research Conference, Edmonton, Alberta, February 22-23, 1991.

Jennett PA, Elford RW, and Sawa RJ. "The Impact of Professional Culture on Learning and Change: Health Promotion in Physicians' Offices" Presented by Dr. P. Jennett to the American Association for Adult and Continuing Education Pre-Conference Workshop, Montreal, Quebec, October 13-15, 1991.

Jennett PA, Cooper M, Edworthy S, Ohlhauser L, Brown M, Goldsand G and McDougall G. "Characteristics of High and Low Users of Office Health Care". Presented by Dr. P. Jennett at the Manpower Conference, Saskatoon, Saskatchewan, April 28-May 1, 1991.

Jennett PA, et.al. "Medical Information System and Medical Informatics". Poster session at ACMC Annual Meeting, Saskatoon, Saskatchewan, April 28-May 1, 1991.

Jennett P, Edworthy SM, and Rosenal TW. "Introducing Medical Informatics as Horizontal Theme into a Medical School Curriculum". Presented by Dr. P. Jennett at the Eighth National Symposium on Computers in Medical Education, Omaha, Nebraska, April 6-7, 1991.

Jennett PA, Parboosingh IJT, Maes WR, Lockyer JM. "Understanding the True Nature of Family Practice: Its Importance in the Maintenance of Competence". Poster session presented at the Medical Informatics and Medical Education Conference, Prague, Czechoslovakia, September 3-7, 1990.

Jennett PA, Parboosingh IJT, Maes WR, Lockyer JM and Lawson D. "Medical Rural/Academic Computer and Communications Networks: Can They Help With the Management of Medical Knowledge and Information Overload in Rural Practice?" Presented by P.A. Jennett at the Ninth International Congress on Medical Informatics, Glasgow, Scotland, August 20-23, 1990.

Jennett PA, Parboosingh IJT, Maes WR, Lockyer JM. "Understanding the True Nature of Family Practice: Its Importance in the Maintenance of Competence". Presented by P.A. Jennett at the Fourth Ottawa Conference On Assessing Clinical Competence, Ottawa, Ontario, July 7-10, 1990.

Jennett PA, Parboosingh IJ, Maes WR, Lockyer JM and Lawson D. "A Medical Information Networking System Between Practitioners and Academic Consultants". Presented by P.A. Jennett at the Congress on Continuing Medical Education, San Antonio, Texas, April 18-22, 1990.

Eagle CJ, Jennett PA, and Mandin H. "Learning Issues Identified Using Standardized Patients in a Problem-Based Learning Course". Presented twice by Dr. C.J. Eagle at the Second International Conference on Problem-Based Learning, Yogyakarta, Indonesia, October 7-12, 1990.

Jennett PA. "Medical informatics - networking rural and academic practice: Can a medical information system help?" Presented by P.A. Jennett at

MEDINFO 89, 6th World Congress of Medical Informatics, Singapore, December 10-14, 1989.

Jennett PA, Parboosingh IJT, Maes WR, and Lockyer JM. "The management of medical knowledge and information overload in rural practice: Can a medical information system help?" Presented by P.A. Jennett at the Association of American Medical Colleges Annual Meeting, Washington, D.C., October 27-November 2, 1989.

Jennett PA, Parboosingh IJT, Maes WR, and Lockyer JM. "Management of medical knowledge and information overload in rural practice: Can an MIS help?" Poster session presented by Dr. P.A. Jennett at the Association of American Medical Colleges Annual Meeting, Washington, D.C., October 27-November 2, 1989.

Jennett PA, Maes W, Parboosingh J and Lockyer J. "A Medical Information System for Physicians Practicing in Rural Southern Alberta: Professional, Social, and Political Accountability". Presented by P.A. Jennett at the Canadian Evaluation Society Annual Meeting, Fredericton, New Brunswick, May 29-31, 1989.

Jennett PA, Van Rosendaal GMA, Lockyer JM, McDougall GM, Hunter KE, and Schachar NS. "Peer evaluation in residency programs". Presented by P.A. Jennett at The Third International Conference on Teaching and Assessing Clinical Competence", Groningen, The Netherlands, May 22-24, 1989.

McDougall GM, Jennett PA, Hunter KE, Schachar NS, Lockyer JM, and Van Rosendaal GMA. "Predictive and comparative study of resident assessment (A collaborative and longitudinal study)". Presented by G.M. McDougall at The Third International Conference on Teaching and Assessing Clinical Competence", Groningen, The Netherlands, May 22-24, 1989.

Jennett PA, Hunter KL, Baumber JS, Gupta D. Medical School M.D. Graduates' Activities in Research and Teaching (Alberta Medical Schools 1973-1985). Presented by Dr. P. Jennett at the Association of American Medical Colleges, Research in Medical Education Conference. Chicago, Illinois, November 1988.

Jennett PA, Hunter KL, Baumber JS, Gupta D. Medical School M.D. Graduates' Activities in Research and Teaching (Alberta Medical Schools 1973-1985). Presented by Dr. P. Jennett at the Association of Canadian Medical Colleges, Physician Manpower Conference. Montreal, Quebec, October, 1988.

Jennett PA, Hunter KL, Baumber JS, Gupta D. Medical School M.D. Graduates' Activities in Research and Teaching (Alberta Medical Schools 1973-1985). Presented by Dr. P. Jennett at the Association for Studies in Medical Education Annual Meeting. Bristol, England, September, 1988.

McDougall GM, Jennett PA. Routes to Licensure--What are the Differences? Presented by Dr. G. McDougall at the Association of Canadian Medical Colleges, Physician Manpower Conference. Montreal, Quebec, October, 1988.

Jennett PA, Hunter KL. Career and practice profiles of Alberta medical graduates 1973-1985. Implications for manpower planning and decision making. Presented by Dr. P. Jennett at The Second Annual Physician Manpower Conference. Calgary, Alberta, October 18, 1987.

Jennett PA. The patient chart--A tool in the measurement of clinical competence. Presented by Dr. P. Jennett at of The Second Ottawa Conference on Assessing Clinical Competence. Ottawa, Ontario, June 27-30, 1987.

Price P and Jennett PA. A criterion-referenced clinical problem solving pre-clerkship examination. Presented by Dr. P. Price at The Second Ottawa Conference on Assessing Clinical Competence. Ottawa, Ontario, June 27-30, 1987.

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Jennett PA. Community Health Sciences and Health Care Research Group Seminar Series--"Career and Practice Location Choices of Alberta Medical Graduates". May, 1988.

Jennett PA. Medical Education Discussion and Study Group--"Alberta Medical School Graduates' Activities in Research and Teaching". June, 1988.

Jennett PA. General Surgery meeting--"A Longitudinal Multi-Tool Assessment of Residents". Co-presented September, 1988.

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Jennett PA. Quality Assurance--A Hospital Approach. Medical Audit Committee and Department of Medicine Residents, University Hospital, Saskatoon, Saskatchewan, 1978.

Jennett PA. Patients' Rights. Panel Moderator, Saskatchewan Association of Health Record Administrators Annual Meeting, 1978.

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