ISfT

International Society for Telemedicine

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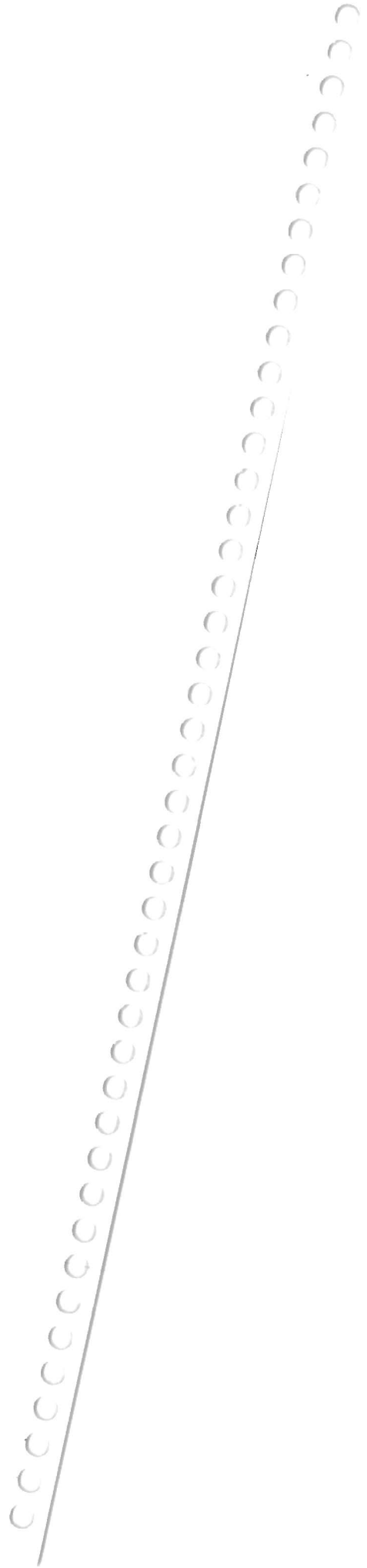
HOSTED BY
THE CANADIAN SOCIETY
OF TELEHEALTH

THE **5**TH INTERNATIONAL CONFERENCE
ON THE MEDICAL ASPECTS OF TELEMEDICINE

&

THE **2**ND ANNUAL MEETING OF THE
INTERNATIONAL SOCIETY FOR TELEMEDICINE

**OCTOBER 1 - 4, 2000
PALAIS DES CONGRÈS
MONTRÉAL**

Dear colleagues,

As President of the International Society for Telemedicine (ISfT), I am pleased to welcome you to the *5th International Conference on the Medical Aspects of Telemedecine*, in Montréal, Canada, from October 2 to 4, 2000.

Dr. Steinar Pedersen

Telemedicine has progressed significantly since our first conference was held, in 1993, at the University of Tromsø, in Norway. Its uses have expanded considerably - in primary care, emergency care and a range of specialties, as well as in nursing, consultation, education and mentoring. Telemedicine has improved the management of electronic patient records and facilitated the integration of healthcare systems. It has brought rural medicine into the mainstream, and its value in maritime, military and space applications has proven to be considerable. Much is expected of it in developing countries, in the coming years. National and international networks of Telemedicine are quickly emerging, in tandem with technological advancements. The clinical and technical standards of our specialty are steadily improving as well, as is its cost/benefit ratio. This *5th International Conference of the ISfT* will allow us to measure the extent of our progress, to ponder the legal, ethical and economic issues that are raised and to cast a look at the likely future of our profession.

Our host, the Canadian Society of Telehealth (CST), has developed an excellent program, with speakers coming from all regions of the globe. Since we are at the vanguard of medicine, it is of the utmost importance that we maintain our edge... For this reason, we appreciate your presence at this first-class event!

I wish to add that the setting of this *5th International Conference on the Medical Aspects of Telemedecine* is magical in many respects. Montréal is one of the oldest European settlements in North America, and its restored historical district is located minutes from where the conference is held. It is also a vibrant, modern city - very active in several high-technology fields of interest to us. Its food is excellent, its cultural life teaming and its bilingual population brimming with joie de vivre!

Steinar Pedersen, President
The International Society for Telemedicine

Dr. André Lacroix   Dr. Mamoru Watanabe

Dear friends,

As Chairman and Co-Chair of the Executive Committee of the *2nd Annual Meeting of the International Society for Telemedicine (ISfT)* and the *5th International Conference on the Medical Aspects of Telemedicine*, hosted by the Canadian Society of Telehealth (CST), we are pleased to present the final version of our programme.

You will note that the topics are as diversified as they are fascinating. We have been fortunate in obtaining the participation of many of the most eminent practitioners of telemedicine in the world – as you will see in this programme. We are therefore proud to state that, over the three days of the Conference, participants will gain a world perspective, on a range of up-to-the-minute developments relating to the practice of telemedicine and telehealth.

We look forward to the rich content you provided in the abstracts to this exciting *2nd Annual Meeting of the ISfT* and the *5th International Conference on the Medical Aspects of Telemedicine!*

André Lacroix
Meeting Chairman

Mamoru Watanabe
Meeting Co-Chair
and President of the CST

Sponsors

The 2nd Annual Meeting of the ISfT and the 5th International Conference on the Medical Aspects of Telemedicine wishes to acknowledge the support of the following:

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EXECUTIVE COMMITTEE

André Lacroix	*Chairman, Canada*
Mamoru Watanabe	*Co-Chair, President CST, Canada*

ISfT EXECUTIVE COMMITTEE

Steinar Pedersen	*President ISfT, Norway*
Ace Allen	*Treasurer ISfT, USA*
Guy Harris	*Secretary ISfT, Japan*

INTERNATIONAL PROGRAM COMMITTEE

Alain Cloutier	*Canada*
Pavel Hamet	*Canada*
Jean-Claude Healy	*Belgium*
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Jean-François Meunier	*Canada*
Dan Michaeli	*Israel*
Michael Nerlich	*Germany*
Oleg Orlov	*Russia*
Dittmar Padeken	*Germany*
Jocelyne Picot	*Canada*
Ron Poropatich	*USA*
Ricky J. Richardson	*UK*
Jay Sanders	*USA*

CONGRESS VENUE

The 2nd Annual Meeting of the ISfT and the 5th International Conference on the Medical Aspects of Telemedicine will be held at the Palais des Congrès (Montréal Convention Centre), located at 201 Viger Avenue West, Montréal, Québec, Canada. The Conference venue is within walking distance of major downtown hotels.

ON-SITE REGISTRATION PROCEDURE

Before attending any scientific sessions, all Conference participants must register at the Registration Desks on the 4th floor of the Palais des Congrès. At Registration, participants will be given the full portfolio of Conference materials including the Conference badge which permits entrance to all sessions.

REGISTRATION HOURS

Sunday, October 1 . . . . . . 10:00 am - 8:00 pm

Monday, October 2 . . . . . . 7:30 am - 7:00 pm

Tuesday, October 3 . . . . . . 7:30 am - 7:00 pm

Wednesday, October 4. . . . 7:30 am - 5:00 pm

ON-SITE REGISTRATION AND METHOD OF PAYMENT

Payment of Registration Fees may be made with the following:

1) Canadian or US dollars

2) Canadian or US Travellers Cheques

3) Credit cards: MasterCard or VISA only

BADGES

Official Conference Badges will be required for admission to all Conference functions, scientific sessions and exhibition area. Individuals who lose their badges will be required to pay a fee to obtain a personalized replacement badge.

DELEGATE REGISTRATION INCLUDES

- Access to all Scientific Sessions and the Exhibition

- One copy of the Final Program / Abstracts

- Opening Ceremony and Welcome Reception

- Concert at Saint Patrick's Basilica

- Gala Dinner at the Museum of Fine Arts

- Continental Breakfasts in Exhibition Hall (407 C)

- Health Breaks in Exhibition Hall (407 C)

- Lunches in Exhibition Hall (407 C)

- Attendance Certificate

EXHIBITS

An exhibition of professional and scientific products, materials and services will take place Monday through Wednesday, October 2 - 4. Delegates are encouraged to visit these exhibits to see the state-of-the-art equipment, products and publications relating to telemedicine and Telehealth.

FOREIGN EXCHANGE & BANKING FACILITIES

There are ample banking facilities in the immediate vicinity of the Palais des Congrès. These are generally open between 10:00 am - 3:00 pm, Monday to Friday.

INSURANCE

The International Society for Telemedicine and the Canadian Society of Telehealth cannot accept liability for injuries or losses arising from accidents or other situations during or as a consequence of the Conference.

Access to Canada's health care services are very costly for non-residents, therefore, it is recommended that participants arrange health and accident insurance prior to travelling to the Conference.

MEALS

Continental breakfasts, health breaks and lunches are offered free of charge to all registered delegates.

A continental breakfast will be served on Tuesday and Wednesday in the Exhibition Hall (Room 407 C), from 7:30 to 8:30 am.

Health breaks and lunches will be served at their designated times on Monday, Tuesday and Wednesday in the Exhibition Hall (Room 407 C).

There are also ample and varied facilities for eating in and around the Conference site.

OFFICIAL LANGUAGE

English is the official language of both the 2nd Annual Meeting of the ISfT and the 5th International Conference on the Medical Aspects of Telemedicine.

NO-SMOKING POLICY

The Conference will adhere to a strict no-smoking policy within all areas of the Palais des Congrès.

POST-CONFERENCE

Any post-Conference inquiries may be sent through our website at www.isft2000.com .

AIRPORT INFORMATION

Montréal is served by two airports: **Dorval** (US, intercontinental and domestic flights) and **Mirabel** (charter flights). A typical taxi fare between Dorval and downtown Montréal is about $28 CDN, while Mirabel to downtown Montréal is approximately $60.

AIRPORT SHUTTLES

Dorval   - $9 CDN
Mirabel - $15 CDN

DORVAL AIRPORT IMPROVEMENT FEE

Upon departure, all travellers are required to pay an airport improvement fee of $10 CDN.

CAR RENTAL

Major car rental firms have offices at both airports (Dorval and Mirabel), Central Train Station and most major hotels.

TRAINS

Regular train service to Montréal is available from many major cities.

VISA REQUIREMENTS

A visa is required for residents of certain countries. Please consult the Canadian Embassy, High Commission or Consulate in your country. U.S. residents need proof of citizenship to enter Canada.

TRANSPORTATION (LOCAL)

Getting around Montréal could hardly be easier; taxis are plentiful, streets are safe and the public transit system is a model of efficiency.

TAXIS

Taxicabs may be hailed in the street or ordered by telephone. The basic rate upon beginning a taxi ride in Montréal is $2.95 CDN. Drivers are usually tipped between 10% and 15% of the fare.

MÉTRO (SUBWAY)

Montréal's Métro is widely recognized as one of the most modern and effective underground transit systems in the world, and is enhanced by beautifully decorated stations created by Québec's most gifted and celebrated artists. Rapid trains move in unmatched quiet at regular intervals. The Métro is part of Montréal's great underground world!

MÉTRO HOURS

5:00 am to 1:30 am seven days a week. For assistance and passenger information regarding the Métro (subway and bus routes) call: AUTOBUS (288-6287).
Information office hours: Monday through Friday from 7:00 am to 8:30 pm, Saturday and Sunday from 8:30 am to 4:30 pm.

Within the Métro system, information can be obtained by picking up the "information phone" found at the ticket agents booth and directing your inquiries.

FARE:

Adults: $2.00 or 6 tickets for $8.25

Bus drivers do not sell tickets nor distribute change.

CLIMATE AND CLOTHING

October is a beautiful fall month in Montréal; average daytime temperature from 5° C to 18° C. As the weather may vary we recommend that you take along a sweater and a raincoat or umbrella.

CREDIT CARDS

All major credit cards are honoured in hotels, most restaurants, department stores and shops, as well as for most sightseeing activities and services.

VOLTAGE

Electricity in Canada is 110-volt, 60 Hz Alternating Current. All non-North American appliances require an adaptor for the current as well as for the plug. Hotels may also be able to provide adaptors.

UNITS OF MEASURE

Canada uses the Metric System.

VISITOR'S GUIDE / TOURIST INFORMATION

Infotouriste:
1001 Square Dorchester
(between Peel and Metcalfe Streets)
Open daily from 9:00 am to 5:00 pm.

TAXES

The Federal Goods and Services Tax (GST; TPS in french) of 7% applies to all purchases.
In addition, the Québec Sales Tax (QST; TVQ in french) adds 7.5% to the total after the GST is included. Non-residents can apply for GST and QST rebates on most goods and hotel accommodations. Tax rebate forms may be obtained at the Palais des Congrès and at the airports. Call 1-800-668-4748 to reach the Central Tax Rebate Information Hotline.

OPENING CEREMONY AND WELCOME RECEPTION

SUNDAY, OCTOBER 1, 2000
6:30 PM

PALAIS DE CONGRÈS DE MONTRÈAL
FOURTH FLOOR

CONCERT

MONDAY, OCTOBER 2, 2000
7:00 pm

I MUSICI DE MONTRÉAL
CHAMBER ORCHESTRA

SAINT PATRICK'S BASILICA

460 René-Lévesque Blvd. West

CONFERENCE GALA DINNER
AND MUSEUM VISIT

TUESDAY OCTOBER, 3, 2000
8:00 pm

THE MONTRÉAL MUSEUM OF FINE ARTS
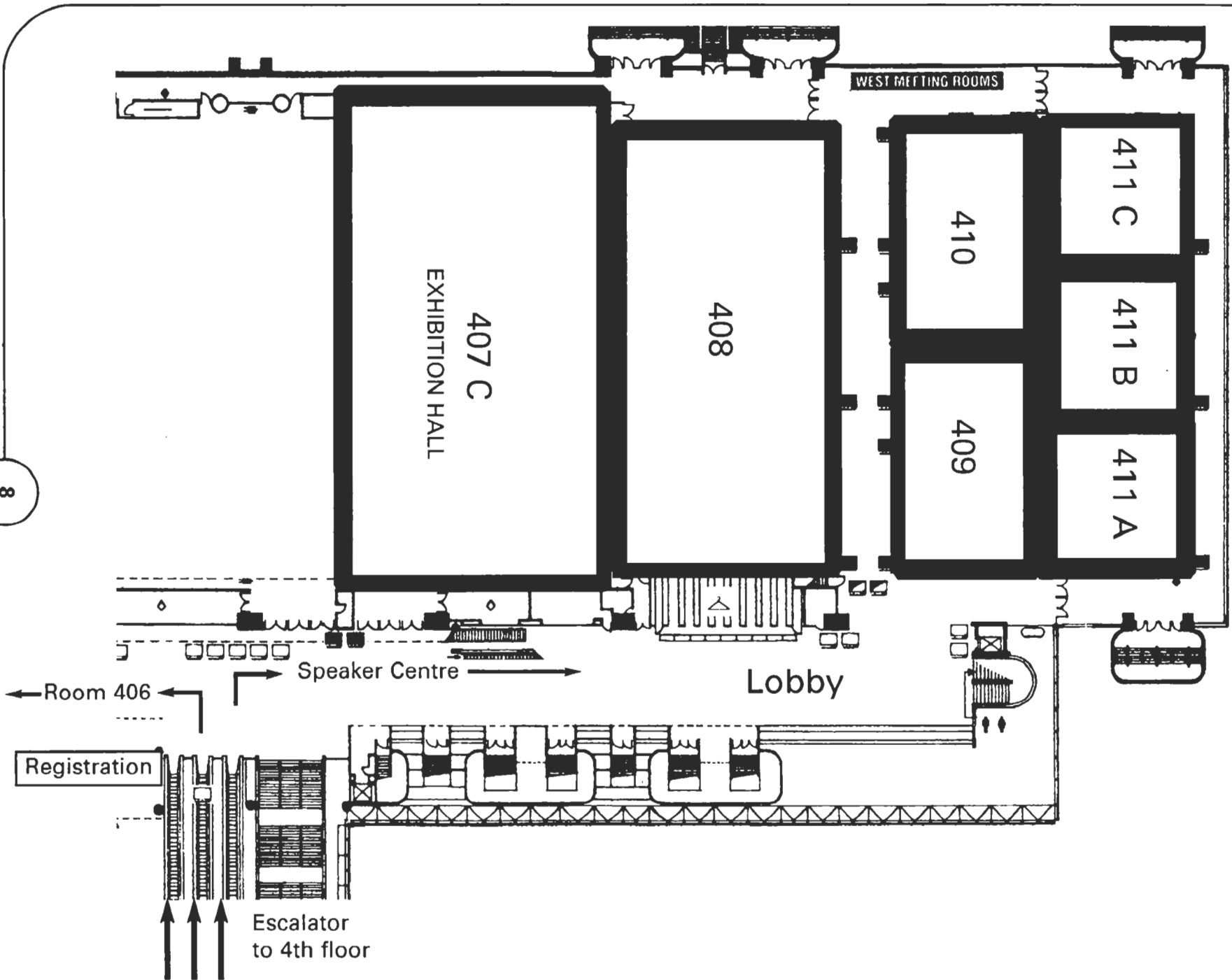*1380 Sherbrooke Street West*

ISfT 2000

WEST MEETING ROOMS

407 C
EXHIBITION HALL

408

410

409

411 C

411 B

411 A

Speaker Centre

← Room 406 ←

Lobby

Registration

↑↑↑

Escalator
to 4th floor

8

FLOORPLAN
Palais de Congrès

	Sunday October 1		Monday October 2		Tuesday October 3		Wednesday October 4
07:30 am					Continental Breakfast 407 C		Continental Breakfast 407 C
08:00 am							
08:30 am			Conference Opening		SYMPOSIUM Role of Telemedicine in Space Research		SYMPOSIUM
09:00 am							Applications of Home Care
09:30 am			CST Awards Keynote Speaker				
10:00 am			Health Break		Health Break		Health Break
10:30 am		REGISTRATION	SYMPOSIUM National Deployment of Telemedicine	REGISTRATION	SYMPOSIUM Canadian Telehealth Overview	REGISTRATION	BREAKOUT SESSIONS
11:00 am	REGISTRATION						
11:30 am							
12:00 pm			LUNCH in Exhibit Hall 407 C		LUNCH in Exhibit Hall 407 C		LUNCH in Exhibit Hall 407 C
12:30 pm							
01:00 pm							
01:30 pm			SYMPOSIUM		SYMPOSIUM		SYMPOSIUM
02:00 pm			Telelearning		The Use of Internet in Telehealth		International Networks in Telemedicine
02:30 pm							
03:00 pm			Health Break		Health Break		Health Break
03:30 pm			BREAKOUT SESSIONS		BREAKOUT SESSIONS		BREAKOUT SESSIONS
04:00 pm							
04:30 pm	CST ANNUAL BUSINESS MEETING						
05:00 pm			POSTER SESSION & WINE & CHEESE		SYMPOSIUM Impacts of Telemedicine		CLOSING PRESENTATION and Future Meeting
05:30 pm							
06:00 pm							
06:30 pm	ISfT/ CST 2000 WELCOME RECEPTION						ISfT Business Meeting
07:00 pm			CONCERT I Musici de Montréal St. Patrick's Basilica		Visit and Gala Dinner at the Museum of Fine Arts 08:00 pm		
07:30 pm							

Afternoon		**REGISTRATION**	
4:00 - 6:30 pm		**CST ANNUAL BUSINESS MEETING** *(Closed Session for CST Members)*	*Room 401*
6:30 - 8:00 pm		**ISFT/CST ANNUAL MEETING WELCOME RECEPTION**	*Foyer*

8:30 - 9:00 am		**OFFICIAL OPENING AND WELCOME**	*Room 408*

Dr. Steinar Pedersen,
President ISfT, Tromsø, Norway

Dr. Mamoru Watanabe,
*President, Canadian Society of Telehealth,
Calgary, Canada*

Dr. André Lacroix,
CHUM, Montréal, Canada

Representative of the government of Canada

Representative of the government of Québec:
Mrs. Pauline Marois,
Minister of Health and Social Services

9:00 - 9:40 am		**THE CANADIAN SOCIETY OF TELEHEALTH YEAR 2000 AWARDS**	*Room 408*

Chairs: Dr. Mamoru Watanabe, CST, Canada
Dr. André Lacroix, CHUM, Canada

Recipients: Dr. Max House,
Lieutenant Governor of Newfoundland
"The sustainability of Telehealth in Canada"

Professeur Louis Lareng,
*Director, Institut Européen de Télémédecine
CHU de Toulouse, France
"The Sustainability of Telehealth in Midi-Pyrénées, France"*

9:40 - 10:00 am		**KEYNOTE SPEAKER**	*Room 408*

Healthcare Delivery in Year 2050: The Impact of Telemedicine
Dr. Ricky J. Richardson,
Chairman - UK Telemedicine Association

10:00 - 10:30 am	**HEALTH BREAK**	*Room 407 C*

10:30 am - 12 noon	**SYMPOSIUM:** **DEPLOYMENT OF TELEMEDICINE IN A NATIONAL CONTEXT**	*Room 408*

Chairs: Dr. Jay Sanders, USA
Mrs. Janice Hopkins, Health Canada

Telemedicine in Norway: From Experiments to Integration
Dr. Steinar Pedersen,
President ISfT, Tromsø, Norway

Malaysian Approach in Developing a National Health Infrastructure
Dr. Abu Bakar Suleiman,
Director General of Health Malaysia

A Province-Wide Telehealth System In Alberta, Canada
Dr. Trevor Cradduck,
Director of Telehealth, Alberta Wellnet

Telemedicine in Japan: Public and Private Cooperation
Pr. Shigekoto Kaihara,
Head of Telemedicine Study Group, Japan

12:00 - 12:15 pm   **Live Demonstration of Multipoint Pediatric**
Network of Québec
Dr. Alain Cloutier, CHUL, Université de Montréal

12:15 - 1:30 pm	**LUNCH - VISIT OF THE EXHIBITION**	*Room 407 C*

1:30 - 3:00 pm	**SYMPOSIUM: TELELEARNING**	*Room 408*

Chairs: Dr. Shigekoto Kaihara, Japan
Dr. Jocelyne Picot, Canada

Cybersessions in Continuous Medical Education
Mr. Roger Simard, President
Conceptis Technologies, Montréal, Canada

2001: The Health Odyssey and the WHO Supercourse
Dr. Ronald E. LaPorte,
Director, Disease Monitoring and Telecommunications,
WHO Collaborating Center, University of Pittsburgh

The Use of Telemedicine and Internet in Surgical Training:
(via video conference)
Pr. Jacques Marescaux,
President, *IRCAD-EITS, CHU Strasbourg, France*

3:00 - 3:30 pm	**HEALTH BREAK**	*Room 407 C*

3:30 - 5:00 pm	**BREAKOUT SESSIONS**	*Rooms 409, 410, 411 A, 411 B, 411 C*

3:30 - 5:00 pm	**TELE-EDUCATION I**	*Room 409*

Chair: Andrea Battcock

3:30 pm

ABSTRACT 1
Value of Using Videoconferencing for Intra-Regional Medical Rounds
Karen Kroeker, Robert Johnston, Steven Edworthy,
Peter Sargious, Penny Jennett, Ming Gao, Tom Rosenal
CRHA & University of Calgary, Canada

3:45 pm

ABSTRACT 2
**Lessons Learned from the Continuous Medical Education Program
of the Quebec Inter-regional Telemedicine Network**
André Lacroix, Pierre Robillard, Mario Dallaire,
Marcellin Ayé, Claude Sicotte
*Hôtel-Dieu du CHUM, Centre Hospitalier de Rouyn-Noranda,
Groupe de Recherche Interdisciplinaire en Santé de l'Université
de Montréal, Québec, Canada*

4:00 pm

ABSTRACT 3
**Videoconferencing for Continuing Medical Education:
From Pilot Project to Sustained Program**
Michael Allen, Joan Sargeant
Dalhousie University, Halifax, Nova Scotia, Canada

4:15 pm

ABSTRACT 4
**Effects of an Educational Program on Aboriginal Persons
with Diabetes at Risk of Developing Chronic Renal Failure (CRF)**
Monique Cormier-Daigle, Corporation Hospitaliere
Beauséjour, New Brunswick, Canada

4:30 pm

ABSTRACT 5
**A Collaborative Approach in Delivering Continuing Nursing Education
Programs to Nurses in Nova Scotia via the Telehealth Network**
Ann Duncan
*Continuing Nursing Education, St. Martha's Regional Hospital,
Antigonish, Nova Scotia, Canada*

4:45 pm

ABSTRACT 6
From Satellite to Web Based CME in Europe
Howard Young
*School of Postgraduate Medical and Dental Education,
Cardiff, Wales, UK*

| 3:00 - 3:30 pm | **HEALTH BREAK** | · *Room 407 C* |

| 3:30 - 5:00 pm | **BREAKOUT SESSIONS** | *Rooms 409, 410, 411 A, 411 B, 411 C* |

3:30 - 5:00 pm **CLINICAL AND TECHNICAL STANDARDS IN TELEMEDICINE** *Room 411 A*

Chair: Linda Weaver

3:30 pm ABSTRACT 7
Telehealth Standards – Not just about Technology
Linda Weaver
TecKnowledge Healthcare Systems Inc., Halifax, Nova Scotia, Canada

3:45 pm ABSTRACT 8
Making Telehealth Systems Work Together:
Understanding Interoperability
Dale Bergman, Ralph Ulmer, Peter Sargious
Alberta Research Council, Calgary, Alberta, Canada

4:00 pm ABSTRACT 9
Telehealth Interoperability Lab :
An Approach to Interoperable Telehealth Systems Development
Peter Sargious, Eugene Igras, Ralph Ulmer
Alberta Research Council, Calgary, Alberta, Canada

4:15 pm ABSTRACT 10
Developing a Generic Infrastructure for Telehealth Services
in Rural and Remote Areas
Penny Jennett, J. Bates, M. Blouw, J. Cairns, , R. Fisher, J. Gilbert,
T. Healy, K. Ho, A. Kazanjian, M. Leisinger, D. Mason, D. Richardson, ·
B. Woollard, J. Wootton
University of Calgary, Health Sciences Centre, Alberta, Canada

4:30 pm ABSTRACT 11
Requirements for the Integration of Medical Images
in Videoconferencing Sessions
Alain Gauvin, Jacques Thille, André Lacroix, Pierre Robillard,
Raymond Carrier, Jean-François Talbot, René Rebeaud
Centre hospitalier de l'Université de Montréal, Québec, Canada

4:45 pm ABSTRACT 12
Integrating Internet, Remote db and Health Cards:
The G8 Cardio-ANMCO Project for CCU's
Domenico Cianflone, Marco Tubaro, Giancarlo Carini, Andrea Marchesini,
Pierfranco Ravizza, Fabio Fonda, Marina Mustilli
Cardiology Institute, Rome, Italy

3:00 - 3:30 pm	**HEALTH BREAK**	*Room 407 C*
3:30 - 5:00 pm	**BREAKOUT SESSIONS**	*Rooms 409, 410, 411 A, 411 B, 411 C*
3:30 - 5:00 pm	**RURAL TELEMEDICINE I**	*Room 410*

Chair: Rod Elford

3:30 pm
ABSTRACT 13
A Successful Store and Forward Telemedicine Model:
Linking a Remote Nursing Station to a Regional Hospital in Labrador
Rod Elford, Michael Jong, Karen Horwood, Carl Robbins
Digital Telehealth Inc.; University of Calgary, Health Centre,
Alberta, and Memorial University, St. John's, Newfoundland, Canada

3:45 pm
ABSTRACT 14
The Ikajuruti Inungnik Ungasiktumi (IIU) Network
Tina McKinnon
Department of Health and Social Services, Iqaluit, Nunavut, Canada

4:00 pm
ABSTRACT 15
Demonstration of the Usefulness of Telehealth in Providing
Enhanced Primary Health Services to Three Geographically Remote
Communities in Northern Alberta
Sean O'Neill, G. Denton, P.D. Brockway, M. Davidson
Keeweetinok Lakes Regional Health Authority, Alberta, Canada

4:15 pm
ABSTRACT 16
Teledermatology Outcomes in the Correctional Setting:
A Case-Control Study
Donnie McGrath [1], Shahla Asvadi [1],
Paul Heinzelmann [2], Joseph Cohen [1],
[1]*Lemuel Shattuck Hospital /Tufts University School of Medicine,*
Boston, MA, USA [2] St. Lukes Medical Center, WI, USA

4:30 pm
ABSTRACT 17
Expansion and Implementation of School-Based Telemedicine
Throughout Kansas
David J. Cook, Gary C. Doolittle, Debbi Swirczynski
Kansas University Medical Center, KS, USA

4:45 pm
ABSTRACT 18
Telemedicine Based Pediatric Intensive Care Unit (PICU)
Consultations to Underserved Rural Northern California
Robert Dimand, James Marcin, Harry Kallas,
Cynthia Parke, Steven Struve, Thomas Nesbitt
Davis Dept. of Pediatrics, University of California, Sacramento, CA, USA

| 3:00 - 3:30 pm | **HEALTH BREAK** | *Room 407 C* |

BREAKOUT SESSIONS — 3:30 - 5:00 pm — *Rooms 409, 410, 411 A, 411 B, 411 C*

3:30 - 5:00 pm   **TELEMEDICINE FOR PRIMARY CARE: TELEMONITORING**   *Room 411 B*

Chair: Stephen Maislin

3:30 pm
ABSTRACT 19
**Telecardiology in the Management of Patients
with Suspected Cardiac Events**
Giuseppe Molinari, Giuliano Reboa, Marco Frascio,
Andrea Rolandi, Massimo Leoncini, Antonio Barsotti
Departments of Cardiology and Surgery, University of Genova, Italy

3:45 pm
ABSTRACT 20
Potential for Telemedicine in Routine Pediatric Practice
Kenneth McConnochie, GP Connors, NE Herendeen, GS Liptak
University of Rochester Medical Center, NY, USA

4:00 pm
ABSTRACT 21
Telematics in Risk Factor Interventions
Reinhild Zolg, Günter Topf, Klaus Langguth,
Gerald Holnburger, Egbert Nüessel
*Private Practitioners' Research Institute, Heidelberg,
Software House CoKom, Wertheim, Germany*

4:15 pm
ABSTRACT 22
Managed Care and Telesurveillance a Possible Match ?
Lise R. Talbot, C. Vincent, C. Beaudin
CHUM, Université de Montréal, Québec, Canada

4:30 pm
ABSTRACT 23
Home Telemonitoring in Hypertensive Pregnant Women
Jean-Luc Weber, B. Carbonne, T. Denolle, J. Menard
TAM-Telesanté sarl, Aix en Provence, France

4:45 pm
ABSTRACT 24
Chronic Wound Management in Community and Acute Care
Margaret Ann Tymchuk
Nova Scotia TeleHealth Network, Dartmouth, Nova Scotia, Canada

3:00 - 3:30 pm	**HEALTH BREAK**	*Room 407 C*
3:30 - 5:00 pm	**BREAKOUT SESSIONS**	*Rooms 409, 410, 411 A, 411 B, 411 C*

3:30 - 5:00 pm   **MEDICO-LEGAL AND ETHICAL ASPECTS OF TELEMEDICINE** *Room 411 C*

Chair: Wayne Bell

3:30 pm   ABSTRACT 25
Canadian Perspective On Medico-Legal Issues In Telehealth
Wayne Bell
The Digital Group of Telehealth Companies,
Dartmouth, Nova Scotia, Canada

3:45 pm   ABSTRACT 26
The EHTEL Green Paper on the Legal Ethical
and Security Aspects of European Health Telematics
Benedict Stanberry
Centre for Law Ethics and Risk in Telemedicine,
Cardiff, Wales, UK

4:00 pm   ABSTRACT 27
Legal Aspects of Telemedicine - Experiences Gained
Leif Erik Nohr
National Centre of Telemedicine,
University Hospital Tromsø, Norway

4:15 pm   ABSTRACT 28
Tackling Barriers to Health Telematics:
Crossing the Chasm and Entering the Tornado
Benedict Stanberry
Centre for Law Ethics and Risk in Telemedicine, Cardiff, Wales, UK

4:30 pm   ABSTRACT 29
Legal Issues in International Telehealth Consultation
Barry B. Cepelewick, Stephen J. Schanz
Legamed Inc., Raleigh, North Carolina, USA

4:45 pm   ABSTRACT 30
Medico-Legal and Ethical Aspects of E-mail:
Communication Between Patient and Healthcare Provider
Benedict Stanberry
Centre for Law Ethics and Risk in Telemedicine, Cardiff, Wales, UK

| 5:00 - 6:30 pm | **POSTER SESSION - WINE AND CHEESE** | *Room 407 C* |

Abstract 119

Technical Evaluation and Optimization of a Conventional Teleradiology System
Renald Lemieux, Guy Bisson, Christian Blais, Jean-Marie Moutquin
CHU Sherbrooke, Québec, Canada

Abstract 120

The Telehealth Scholarly Program, Faculty of Medicine, University of Calgary
Penny Jennett
University of Calgary, Health Science Center, Calgary, Alberta, Canada

Abstract 121

Cooperative Internet-Based Telemedicine System
Mohammad Hameed Al-Taei
Zarka Private University, Zarka, Jordan

Abstract 122

**Development of an Image Analysis Software to Assist
in the Diagnostic of Diabetic Retinopathy**
Langis Gagnon, M.-C. Boucher
*Centre de recherche informatique de Montréal;
Hôpital Maisonneuve-Rosemont, Montréal, Québec, Canada*

Abstract 123

Practitioner-Initiated Advice to Patients Through Electronic Modes
Wendy L. Schneider
Alberta Heritage Foundation for Medical Research, Edmonton, Alberta, Canada

Abstract 124

Interconnectivity Challenges Associated with Telehealth
Masako Miyazaki, Toshio Ohyanagi, Steve Sutphen, Dan Reinbold,
Wayne Lamoureux, Clayton Knoll, Anne Walley, Kari Pau
*Telehealth Technology Research Institute,
University of Alberta, Edmonton, Alberta, Canada*

Abstract 125

**Problem-based, Small-Group Continuing Medical Education
by Videoconference**
Michael Allen, Joan Sargeant, Karen Mann, Michael Fleming, John Premi
Dalhousie University, Nova Scotia, Canada

Abstract 126

Tele-Sports Medicine Project between Japan and Canada
Masako Miyazaki, Toshio Ohyanagi, Steven Sutphen, Masaki Katayose,
Masanobu Mitani, Osamu Miyagishi, Tsuyoshi Yamamoto
*University of Alberta, Telehealth Technology Research Institute,
Edmonton, Alberta, Canada*

Abstract 127

Clinical Challenges Associated With Telerehabilitation
Masako Miyazaki, Telehealth Technology Research Institute,
University of Alberta, Edmonton, Alberta, Canada.

| 7:00 - 8:00 pm | **CONCERT**
I MUSICI DE MONTRÉAL CHAMBER ORCHESTRA
SAINT PATRICK'S BASILICA
460 René-Lévesque Blvd. West |

| 7:30 - 8:30 am | **CONTINENTAL BREAKFAST** | *Room 407 C* |

| 8:30 - 10:00 am | **PLENARY SESSION** | *Room 406* |

SYMPOSIUM: THE ROLE OF TELEMEDICINE IN SPACE RESEARCH
(simultaneous bidirectional transmission with Brazil)

Chairs: Dr. Ronald Merrell, Medical College of Virginia, USA
Dr. Rod Elford, Calgary, Canada

What Does Telemedicine Provide to an Astronaut ?
(via video conference)
Mrs. Julie Payette,
Canadian Space Agency and NASA

Linking Space and Terrestrial Medicine
Dr. Dittmar Padeken,
DLR, Köln, Germany

The Use of Telemedicine in the NASA Program
Mr. Charles Doarn,
Executive Director, Commercial Space Center, MCV, USA

The Russian Experience in Using Telemedicine in their Space Program
Dr. Oleg Orlov,
Space Biomedical Center for Training Research, Moscow, Russia

| 10:00 - 10:30 am | **HEALTH BREAK** | |

| 10:30 am - 12 noon | **PLENARY SESSION** | *Room 406* |

Supported by CANARIE Inc.

SYMPOSIUM: CANADIAN TELEHEALTH OVERVIEW
(simultaneous bidirectional transmission with Brazil)

Chairs: Dr. Mamoru Watanabe,
CST, Calgary, President Health Advisory Committee, CANARIE Inc.
Dr. Luc Deschênes,
Directeur Général, Affaires Médicales et Universitaires,
Ministère de la Santé et des Services Sociaux, Gouvernement du Québec

Québec Pediatric Telehealth Network
Dr. Alain Cloutier,
Pediatric Cardiology, CHUL, Quebec

Toronto Sick Children Telehealth Program and International Connections
Dr. Robert Filler,
Director of Telehealth, The Hospital for Sick Children, Toronto

10:30 am - 12 noon	**PLENARY SESSION** *(continued from previous page)*	*Room 406*

Supported by CANARIE Inc.

SYMPOSIUM: CANADIAN TELEHEALTH OVERVIEW
(simultaneous bidirectional transmission with Brazil)

Telenephrology Project
Mrs. Suzanne Robichaud, RN,
Corporation Beauséjour, Moncton, New Brunswick

First Nations Telehealth Research
Mrs. Alexa Brewer,
Director MSB, Health Canada

Trauma Telemedicine in British Columbia
Dr. Kendal Ho,
Associate Dean and Director CME, Health Science Center, Vancouver

12 noon - 1:30 pm	**LUNCH - VISIT OF THE EXIBITION**	*Room 407 C*

1:30 - 3:00 pm	**SYMPOSIUM: THE USE OF INTERNET IN TELEHEALTH**	*Room 408*

Chairs:
Dr. Ricky J. Richardson, *UK*
Dr. Andrew Bjerring, *CANARIE, Ottawa, Canada*

The Convergence of Telehealth and eDisease Management:
Emerging Successful Business and Clinical Models
Mr. Vince Kuraitis, *JD, MBA,*
Principal, Better Health Technologies, Boise, Idaho, USA

Co-Operative Secure Healthcare Network
Dr. Dittmar Padeken,
DLR, Germany

Development of Internet II for Telehealth
Dr. Michael Ackerman,
Assistant Director, National Library of Medicine, USA

Online Healthcare: Smart International Partnerships
Dr. K.C. Lun,
President-elect International Medical Informatics Association,
WHO Centre for Health Informatics, Singapore

3:00 - 3:30 pm	**HEALTH BREAK**	*Room 407 C*

3:30 - 5:00 pm	**BREAKOUT SESSIONS**	*Rooms 409, 410, 411 A, 411 B, 411 C*

3:30 - 5:00 pm	**EVALUATION OF TELEMEDICINE I**	*Room 409*

Chair: Jocelyne Picot

3:30 pm

ABSTRACT 31
**Health Technology Assessment on Videoconferencing
for Telehealth**
Hussein Noorani, Jocelyne Picot, Jill M. Sanders
*Canadian Coordinating Office for Health Technology
Assessment (CCOHTA), Ottawa, Ontario;
Infotelmed Communications Inc, Verdun, Québec, Canada*

3:45 pm

ABSTRACT 32
**Impact Evaluation Methodology of Telemedicine Services
for Intermediary Care**
M. Marzegalli, G. Borghi, M. Fregonara, U. Marini, L. Mittone
S. Carlo Borromeo Hospital, Milano, Italy

4:00 pm

ABSTRACT 33
**DICIT Experience: Intermediary Care Service
for Stabilized Health Patients**
Maurizio Amigoni, S Bordoni, E Fogari, M Fregonara,
E Grasso, C. Magnocavallo
Health General Direction of Lombardy Region, Milano, Italy

4:15 pm

ABSTRACT 34
**Use of Advanced Telecom Services and Applications
by the European Health Sector**
Lutz Kubitschke, Veli N. Stroetmann, Karl A. Stroetmann
*Empirica Gesellschaft fuer Kommunikations-und
Technologieforschung mbH, Bonn, Germany*

4:30 pm

ABSTRACT 35
Technology Assessment of Tele-ultrasound in a Northern Community
Pam Brockway, Sean O'Neill, Gail Robertson, Debby Cyr,
Laurella Monaghan, Cam Donaldson, David Hailey
*Keeweetinok Lakes Regional Health Autority # 15,
Canada and Australia*

4:45 pm

ABSTRACT 36
Image Compression for a Cost-Effective Teleradiology
Werner Stefanson, Dorothee P. Auer, Ludwig M. Auer
Medical Telematics, Salzburg, Austria

| 3:30 - 5:00 pm | **BREAKOUT SESSIONS** | *Rooms 409, 410, 411 A, 411 B, 411 C* |

| 3:30 - 5:00 pm | **TELEMEDICINE IN MEDICAL SPECIALTIES** | *Room 410* |

Chair: John P. Finley

3:30 pm

ABSTRACT 37
Impact of Telemedicine on Pediatric Cardiology Practice 1987-2000
John P. Finley, GP Sharratt, RP Chen, P. Bryan,
J. Wolstenholme, S. McIntyre
*IWK Grace Health Centre, Dalhousie University,
Halifax, Nova Scotia, Canada*

3:45 pm

ABSTRACT 38
Telemedicine and Diabetic Retinopathy Assessment
Marie Carole Boucher
*Hôpital Maisonneuve-Rosemont,
Université de Montréal, Québec, Canada*

4:00 pm

ABSTRACT 39
Email-Based Teleradiology Using Digital Cameras
Donnie Mc Grath, A. Saltzman, D. Carlin, H. Fraser,
S. Munn, B. Carter, C. Wald
*Tufts University School of Medicine; Lahey Clinic;
Harvard Medical School, Boston, MA, USA*

4:15 pm

ABSTRACT 40
Regional Internet-Based Prenatal Sonography
Shai Linn, Etan Zimmer, Moshe Bronstein
*Unit of Epidemiology, Rambmam Medical Center
and Faculty of Medicine, Technion, Haifa, Israel*

4:30 pm

ABSTRACT 41
HC Forum * / A Tele-Expertise in Human Genetics
Olivier Cohen, Marie-Ange Mermet, Jacques Demongeot
Laboratoire TIMC, Medical School of Grenoble, France

4:45 pm

ABSTRACT 42
**Telepsychiatry : New Technology to Reduce Morbidity,
Mortality and Cost ?**
Ann Oberkirch
Yale School of Medicine, Woodbridge, CT, USA

| 3:30 - 5:00 pm | | **BREAKOUT SESSIONS** | *Rooms 409, 410, 411 A, 411 B, 411 C* |

| 3:30 - 5:00 pm | | **INTERNET IN TELEMEDICINE** | *Room 411 C* |

| | Chair: | Rafiq Khan | |

3:30 pm

ABSTRACT 43
Evolution of Telehealth to eHealth and onto the Internet...
Why it Must Happen!
Linda Weaver
TecKnowledge Healthcare Systems Inc., Halifax, Nova Scotia, Canada

3:45 pm

ABSTRACT 44
Telemedicine and Internet
Louis Lareng
Institut Européen de Télémédecine, CHU de Toulouse, France

4:00 pm

ABSTRACT 45
Doctor-Patient Electronic Mail in Psychiatry
Daniel Shuen Sheng Fung
Hospital for Sick Children, Toronto, Ontario, Canada

4:15 pm

ABSTRACT 46
An Innovative Customer-Centered Business Model for
Patient-Centered e-Medicine
Alan Maese, Geeta Naipaul-Denton, Susanna Letwin,
Bob Wilder, Gary Evans, David Green, Robert Jones
Telemedica Group, Markham, Ontario, Canada

4:30 pm

ABSTRACT 47
An Overview of the University of Kansas Center for
Telemedicine and Telehealth :
The Development of an E-Health Program
David J. Cook, Gary G. Doolittle
University of Kansas, Center for Telemedicine and Telehealth,
Kansas City, KS, USA

4:45 pm

ABSTRACT 48
From Biomedical to Patient-Centered Model (PCM) of e-Medicine
Alan Mease, Geeta Naipaul-Denton, Susanna Letwin,
Bob Wilder, Gary Evans, David Green, Robert Jones
Telemedica Group, Markham, Ontario, Canada

3:30 - 5:00 pm	**BREAKOUT SESSIONS**	*Rooms 409, 410, 411 A, 411 B, 411 C*

3:30 - 5:00 pm	**TELE-EDUCATION II: INTERNET IN TELELEARNING**	*Room 411 A*

Chair: Diane Anderson

3:30 pm
ABSTRACT 49
Continuing Health Tele-Education From Nova-Scotia to St-Kitts
Michael Allen, Ian Jacobs, Joan Sargeant
Dalhousie University, Halifax, Nova Scotia,
Canada and Ministry of Health, St. Kitts

3:45 pm
ABSTRACT 50
Transforming Continuing Education Materials for
Online Learning III: Evaluating Outcomes
David Patrick Ryan, Rosemary Waterson, Rory Fisher
Faculty of Medicine, University of Toronto, Ontario, Canada

4:00 pm
ABSTRACT 51
Post-Graduate Medical Training on the WEB:
a Telematics Model for Case Based Learning
Steven Edworthy, Elisia Teixera, Gary Morris,
Sharon Koren, Karen Kroeker, Tom Rosenal. Penny Jennett
University of Calgary, Alberta, Canada

4:15 pm
ABSTRACT 52
Piaget Meets Yahoo: Using the Internet to Promote
Kids Psychosocial Development
Arlette Lefebvre
Hospital for Sick Children, Toronto, Ontario, Canada

4:30 pm
ABSTRACT 53
Overcoming the Technophobia of Child Psychiatrists:
What Works and What Doesn't
Arlette Lefebvre
Hospital for Sick Children, Toronto, Ontario, Canada

4:45 pm
ABSTRACT 54
Virtual In-Hospital Primary School and Communication
System for Hospitalized Children
Yuichi Fujino, K. Nihei, T. Tahara, Y. Kiyosue, T. Kawai,
K. Kakuta, H. Sato, A. Usami
NTT Cyber Solutions Labs., Yokosuka-shi, Kanagawa, Japan

3:30 - 5:00 pm	**BREAKOUT SESSIONS**	*Rooms 409, 410, 411 A, 411 B, 411 C*

3:30 - 5:00 pm	**RURAL TELEMEDICINE II**	*Room 411 B*

Chair: Joan Sargeant

3:30 pm

ABSTRACT 55
Impact of Telehealth Upon Physician Retention and Recruitment
Joan Sargeant, Donald Langille, Michael Allen
Dalhousie University, Halifax, Nova Scotia, Canada

3:45 pm

ABSTRACT 56
**Impact of Telehealth upon Physician Recruitment
and Retention in Rural Areas**
Dan Reid
*TecKnowledge Healthcare Systems Inc,
Halifax, Nova Scotia, Canada*

4:00 pm

ABSTRACT 57
**Experiences Implementing Telehealth in Remote
Communities Across Canada**
Lorna McInroy
Computing Devices Canada, Calgary, Alberta, Canada

4:15 pm

ABSTRACT 58
Managing Westnet Telehealth Expansion: A Good Problem
Mary Deans, Ed Norwich
*Government of the Northwest Territories, Department of
Health & Social Services, Northwest Territories , Canada*

4:30 pm

ABSTRACT 59
**Establishing a Clinical Telehealth Network in Australia:
NSW Telehealth Initiative/sustained & Viable**
Deborah Oong
NSW Health Department, North Sydney, Australia

4:45 pm

ABSTRACT 60
Building a Telehealth Network: Top 10 Factors for Success
Karen Levesque, Audrey Huziak
*Northern Telehealth Network, Saskatoon,
Saskatchewan, Canada*

| 5:15 - 6:30 pm | | **PLENARY LECTURES** | *ROOM 408* |

PRESENT AND FUTURE IMPACTS OF TELEMEDICINE

Chairs: Pr. James McGee, Oxford, UK
Dr. Penny Jennett, Calgary, Canada

Evaluation of Telemedicine in Year 2000
Dr. Rashid Bashshur,
*President, American Telemedicine Association
and Editor-in-Chief, Telemedicine Journal,
University of Michigan, USA*

Global Telemedicine Initiatives at East Carolina University
Dr. David Balch,
*Director, Global Telemedicine Initiatives,
East Carolina University, USA*

Future Technical Developments in Telehealth
Dr. Rick Satava,
Department of Surgery, Yale University, USA

7:15 pm   **VISIT TO THE MONTRÉAL MUSEUM OF FINE ARTS
SHOWCASING "FROM RENOIR TO PICASSO"
FROM LE MUSÉE DE L'ORANGERIE, PARIS**

8:00 pm   **GALA DINNER AT MUSEUM OF FINE ARTS**
1380 Sherbrooke Street West

| 7:30 - 8:30 am | **CONTINENTAL BREAKFAST** | *Room 407 C* |

| 8:30 - 10:00 am | **MORNING SESSION** | *Room 408* |

SYMPOSIUM: APPLICATIONS OF HOME CARE

Chairs: Dr. Dan Michaeli, *Israel,*
Dr. Mats-Ola Svensson, *Sweden*

Telehome Care: Where are we in Year 2000
Dr. Guy Harris,
President, Digital Communications Centre, Tokyo, Japan

Telepsychiatry in Australia -
How Consultation, Prevention and Information Converge
Pr. Peter Yellowlees,
Director of Centre for Online Health,
The University of Queensland, Australia

A Survey of Telehome Care Projects in Japan
Pr. Ken Toyoda,
International University of Health and Welfare, Tokyo, Japan

| 10:00 - 10:30 am | **HEALTH BREAK** | *Room 407 C* |

| 10:30 am - 12:00 noon | **BREAKOUT SESSIONS** | *Rooms 409, 410, 411 A, 411 B, 411 C* |

| 10:30 am - 12:00 noon | **INTEGRATION OF HEALTHCARE I** | *Room 409* |

Chair: Edward Brown

10:30 am

ABSTRACT 61
**From Left-field to Center-field Bringing Telemedicine
into Mainstream Medical Practice**
Edward M. Brown
*Sunnybrook & Women's College Health Sciences Centre,
Toronto, Ontario, Canada*

10:45 am

ABSTRACT 62
Telemedicine in an Integrated Healthcare System
Dan Michaeli
Clalit Health Services, Tel-Aviv, Israel

11:00 am

ABSTRACT 63
**Children's Telehealth Network: Successful Integration of
Telehealth-Region 3 Hospital Corporation Experience**
Charlotte Russell, C. Ingram, C. Rogers
*Region 3 Hospital Corporation, IWK Grace Health Centre,
TecKnowledge Healthcare Systems, Fredericton,
New Brunswick, Canada*

11:15 am

ABSTRACT 64
**Telemedicine in child Psychiatry:
Practices, Policies and Potentials in Canada's
Maritime Provinces**
Herbert Orlik, C. Ingram, Joan Sargeant
Dalhousie University, Halifax, Nova Scotia, Canada

11:30 am

ABSTRACT 65
**A Mother-Child Network: An Innovative Inter-hospital
Care Delivery Solution Using Telemedicine**
Lucie Poitras, Claude Sicotte, Linda Ward
Hôpital Ste-Justine, Université de Montréal, Canada

11:45 am

ABSTRACT 66
The Complexities of Scheduling on a 41 Site Telehealth Network
Tish Campbell
TecKnowledge Healthcare Systems Inc., Halifax, Nova Scotia, Canada

10:30 am - 12:00 noon	**BREAKOUT SESSIONS**	*Rooms 409, 410, 411 A, 411 B, 411 C*

10:30 am - 12:00 noon	**TELEHOMECARE I**	*Room 410*

Chair: Dan Reid

10:30 am

ABSTRACT 67
Telehome Care: The West Prince Telehospice Pilot Project
Rod Elford, Myra Ramsay
Digital Telehealth Inc., Calgary, Alberta, Canada

10:45 am

ABSTRACT 68
Telehealth for Palliative Care : The View From Here
Jay Lynch, Lynda Weaver, Stephanie Langlois,
Marnie Stunt, Pippa Hall, Cori Schroder,
Ray Viola, Maryse Bouvette
University of Ottawa Institute of Palliative Care, Ontario, Canada

11:00 am

ABSTRACT 69
TeleHomeCare: Pilot Applications and Business Perspectives
Lutz Kubitschke, Veli N. Stroetmann, Karl A. Stroetmann
*Empirica Gesellschaft fuer Kommunikations- und
Technologieforschung mbH, Bonn, Germany*

11:15 am

ABSTRACT 70
Evaluation of a Post Cardiac Surgery Telehomecare Program
Richard Scott, James Parrott, Krisan Palmer, David Garnett
*Institute for Health Research, Atlantic Health Sciences Corporation,
Saint John Regional Hospital, New Brunswick, Canada*

11:30 am

ABSTRACT 71
**Telemonitoring of Congestive Heart Failure Patients:
The Ten-HMS-Project**
Veli N. Stroetmann, Karl A. Stroetmann
*Empirica Gesellschaft fuer Kommunikations-und
Technologieforschung mbH, Bonn, Germany*

11:45 am

ABSTRACT 72
Videotelephone Trial for Palliative and Antenatal Cares
Masako Miyazaki, M. Stuart, M. Sandilands, M. Stewart, C. Knoll
University of Alberta, Edmonton, Alberta, Canada

| 10:30 am - 12:00 noon | **BREAKOUT SESSIONS** | *Rooms 409, 410, 411 A, 411 B, 411 C* |

| 10:30 am - 12:00 noon | **INTERNATIONAL NETWORKS: TELEMEDICINE IN DEVELOPING COUNTRIES** | *Room 411 A* |

Chair: Rifat Latifi

10:30 am

ABSTRACT 73
Final Report and Recommendations From the Global Healthcare Applications Sub-Project 4
André Lacroix, *Canada,* Louis Lareng, *France,*
Dittmar Padeken, Michael Nerlich, *Germany,*
Jay Sanders, Charles Doarn, *USA,*
James McGee, Richard Wootton, *UK,*
Yoich Ogushi, Yoshikazu Okada, *Japan,*
Marcello Bracale, *Italy,* Sandra Prerost, *Australia,*
Oleg I Orlov, *Russia*

11:00 am

ABSTRACT 74
Challenges of International Telemedicine
Ken George
TecKnowledge Healthcare Systems Inc.,
Halifax, Nova Scotia, Canada

11:15 am

ABSTRACT 75
International Virtual e-Hospital of Kosova
Rifat Latifi, Michael Nerlich, Ricky Richardson,
Charles R. Doarn, Abdulrahman A. Al
Nuaim, Peter Range, Ronald C. Merrell
Department of Surgery and Medical Informatics and
Technology Applications Consortium, VA, USA;
Virginia Commonwealth University, Richmond, VA, USA;
Regensburg University, Germany;
Great Ormond Street Hospital for Children, UK;
King Specialist Hospital & Research Centre, Saudi Arabia;
Motion Media Technology, UK

11:30 am

ABSTRACT 76
Multinational Distance Learning Project Utilizing Low Bandwidth Internet.
Ivan A. Darenkov, Rifat Latifi, K. Mitchell Russell,
Vladimir A. Lavrentyev, Vanish Kapoor,
Charles R. Doarn, and Ronald C. Merrell
MITAC, Department of Surgery,
Virginia Commonwealth University, Richmond, VA, USA.

| 10:30 am - 12:00 noon | **BREAKOUT SESSIONS** | *Rooms 409, 410, 411 A, 411 B, 411 C* |

| 10:30 am - 12:00 noon | **NEW TECHNOLOGIES IN TELEMEDICINE** | *Room 411 B* |

| Chair: | Jean-Francois Meunier |

10:30 am

ABSTRACT 77
MOMEDA: A Mobile Smartphone Terminal for Dicom Images and Web-based Patient Data
Jarmo Reponen, J. Niinimäki, A. Holopainen, P. Jartti,
E. Ilkko, A. Karttunen, T. Kumpulainen, O. Tervonen, E. Pääkkö
Oulu University, Finland

10:45 am

ABSTRACT 78
Role of French Spatial Agency in Telemedicine
René Rettig
CHU Rangueil and MEDES, Toulouse, France

11:00 am

ABSTRACT 79
Using the Internet to Improve Care Delivery
William S. Kazman
Global Telemedix Inc., Wakefield, MA, USA

11:15 am

ABSTRACT 80
**Analogous Environments as Telemedicine Testbeds:
Experience at Devon Island**
Brett Harnett
*MITAC, Virginia Commonwealth University,
Richmond, Virginia, USA*

11:30 am

ABSTRACT 81
The Potential of Video-Telephone for Telehealth
Masako Miyazaki, Toshio Ohyanagi, Masanobu Mitani
*University of Alberta, Telehealth Technology Research Institute,
Edmonton, Alberta, Canada*

11:45 am

ABSTRACT 82
The Open Source Model: A Strategic Catalyst for Telehealth
Joseph Dal Molin,
Minoru Development Corporation, Canada

10:30 am - 12:00 noon	**BREAKOUT SESSIONS**	*Rooms 409, 410, 411 A, 411 B, 411 C*

10:30 am - 12:00 noon	**EVALUATION OF TELEMEDICINE II**	*Room 411 C*

Chair: Trevor Cradduck

10:30 am

ABSTRACT 83
Developing a Provincial Telehealth Evaluation System
Marilynne Hebert, Penny Jennett, Trevor Cradduck
Health Telematics Unit, University of Calgary,
Alberta Wellnet, Alberta, Canada

10:45 am

ABSTRACT 84
An Approach for Development of Common Outcome
Indicators for Evaluation of Telehealth Programs
Richard Scott, Frank McCarthy
Institute for Health Research, St-John Regional Hospital,
New Brunswick, Canada

11:00 am

ABSTRACT 85
Assessment of Teleconsultations in a Northern Health Region
Pam Brockway, Raymond Howard, Paul Davis,
David Hailey, Cameron Donaldson
Keeweetinok Lakes Regional Health Autority #15,
Slave Lake, Alberta, Canada and Australia

11:15 am

ABSTRACT 86
Evaluation of a Tele-dialysis Pilot Project
Jocelyne Picot, L. Heaton, J. Jackson
Infotelmed Communications, Verdun, Québec, Canada

11:30 am

ABSTRACT 87
The Nova Scotia Telehealth Network:
Evaluation Achievements and Questions
Joan Sargeant
Dalhousie University, Halifax, Nova Scotia, Canada

11:45 am

ABSTRACT 88
Telehealth in the Newfoundland Offshore Petroleum Industry
Carl Robbins
Memorial University, St John's, Newfoundland, Canada

| 12 noon - 1:30 pm | **LUNCH - VISIT OF THE EXIBITION** | *Room 407 C* |

AFTERNOON SESSION

1:30 p.m. - 3:00 p.m.   **SYMPOSIUM: ON INTERNATIONAL NETWORKS IN TELEMEDICINE**

Chairs: Dr. Guy Harris, *Secretary, ISfT, Japan*
Dr. Robert Filler, *Vice-president, CST, Toronto, Canada*

WHO's Telemedicine Strategy for Developing Countries
Dr. Salah Mandil,
Director, Health Informatics and Telematics, WHO,
Geneva, Switzerland

The European Approach to Networking
Pr. Jean-Claude Healy,
European Commission, Brussels, Belgium

Operational Telemedicine Capability in Remote Environments -
Past, Present and Future
Dr. Ron Poropatich,
Director, Telemedicine Directorate,
Walter Reed Army Medical Center, Washington, DC

International Guidelines for Teleconsultation
Pr. Michael Nerlich,
Head of Trauma Surgery, Regensburg,
Germany and member of G8 SP-4 working group

| 3:00 - 3:15 pm | **HEALTH BREAK** | *in the Foyer* |

| 3:15 - 4:45 pm | | **BREAKOUT SESSIONS** | *Rooms 409, 410, 411 A, 411 B, 411 C* |

| 3:15 - 4:45 pm | | **TELECONSULTATION: RURAL TELEMEDICINE III** | *Room 409* |

Chair: Carl Robbins

3:15 pm
ABSTRACT 89
**Melting the Miles; Telepsychiatric Consultation
to Underserviced Areas**
Elsa Broder, Jeffrey Hawkins
*Telepsychiatry Program, Division of Child Telepsychiatry,
University of Toronto, Ontario, Canada*

3:30 pm
ABSTRACT 90
Second Medical Opinion. Do we need it?
Vojka Gorjup, Anja Jazbec, Borut Gersak, Annette Godler
Medical Center Ljubljana, Slovenia

3:45 pm
ABSTRACT 91
**Tele-Consultation -
An Implementation Process for Successful Buy-in**
Roberta Staveley
Telehealth Resource Group Inc., Calgary, Alberta, Canada

4:00 pm
ABSTRACT 92
**Telehealth and Telelearning Networks for Remote
Communities and Emergency Medicine:
A Newfoundland and Labrador Program**
Abdul Lakhani
Telesat Canada, Gloucester, Ontario, Canada

4:15 pm
ABSTRACT 93
**Delivering Cardiac Rehabilitation to Patients
in Rural Canada over the Internet**
Joanna Bates, Joy Johnson, Martha MacKay, Scott Lear
*University of British Columbia,
Vancouver, British Columbia, Canada*

4:30 pm
ABSTRACT 94
Wireless Telemedicine Study
Tommi Salomaa, Dominik Jaworek, Maini Williams
Nokia Mobile Phones, Irving, Texas, USA

3:15 - 4:45 pm	**BREAKOUT SESSIONS**	*Rooms 409, 410, 411 A, 411 B, 411 C*

3:15 - 4:45 pm	**COST AND BENEFIT OF TELEMEDICINE**	*Room 410*

	Chair :	Richard Scott

3:15 pm   ABSTRACT 95
**Cost Comparison of Two Broad-Bandwidth
Cardiac Tele-Consultation Services**
Richard Scott, David Marr, Krisan Palmer, David Garnett
*Institute for Health Research,
5DN St-John Regional Hospital, New Brunswick, Canada*

3:30 pm   ABSTRACT 96
**A Cost-Minimization Analysis of a Realtime
Teledermatology Service in Northern Norway**
Trine S. Bergmo
National Centre of Telemedicine, Tromso, Norway

3:45 pm   ABSTRACT 97
**Costs and Potential Benefits of Health Telematic
Applications - a DELPHI Approach**
Markus Lindlar
University of Cologne, Germany

4:00 pm   ABSTRACT 98
**Telehealth Cost-Benefit Evaluation:
Policy and Decision Makers**
Penny Jennett, David Hailey
*University of Calgary, Health Sciences Centre,
Calgary, Alberta, Canada*

4:15 pm   ABSTRACT 99
**Economic Potential of IP-Based Realtime
Teledermatology in Northern Norway**
Elin Breivik,
National Centre of Telemedicine, Tromsø, Norway

3:15 - 4:45 pm   **BREAKOUT SESSIONS**   *Rooms 409, 410, 411 A, 411 B, 411 C*

3:15 - 4:45 pm   **EMERGENCY TELEMEDICINE; TELEMEDICINE IN**   *Room 411 A*
                        DEVELOPING COUNTRIES II

          Chair: Michael Nerliech, *Germany*

3:15 pm   ABSTRACT 101
                        Innovation in Tele-Paramedic Service
                        Masako Miyazaki, Lloyd Osler, Dave Dutchak
                        Telehealth Technology Research Institute,
                        University of Edmonton, Alberta, Canada

3:30 pm   ABSTRACT 102
                        Integrated Emergency Medicine Network (IEMN)
                        Patricia Dwyer, R.N.
                        Collaborative Network Technologies in association
                        with MVN Telemedicine/Tetra,
                        St-Johns, Newfoundland, Canada

3:45 pm   Abstract 103
                        IEMN Application and Services
                        Patricia Dwyer, R.N.
                        Collaborative Network Technologies in association
                        with MUN Telemedicine/Tetra,
                        St-Johns, Newfoundland, Canada

4:00 pm   ABSTRACT 104
                        Ontario CritiCall program The One-Number-to-Call
                        Referral Service for Physicians
                        Trish Simmons, Shelley Moneta
                        Ontario CritiCall Program, Hamilton, Ontario, Canada

4:15 pm   ABSTRACT 105
                        Creating Free Software for Telemedicine in
                        Developing Countries
                        Hamish S. F. Fraser MB, MSc[1,2], Darius Jazayeri[2] BA,
                        Libby Levison[2] PhD, St, John D McGrath MD[3].
                        1 Children's Hospital Informatics Program, Boston, MA,
                        2 MIT Laboratory for Computer Science, Cambridge MA,
                        3 Tufts University, Boston, MA

4:30 pm   ABSTRACT 106
                        Virtual Presence at Faculty Hospital in Slovakia
                        Lois Lynch,
                        Women and Infants Hospital,
                        Providence, Rhode Island, USA

3:15 - 4:45 pm   **BREAKOUT SESSIONS**   *Rooms 409, 410, 411 A, 411 B, 411 C*

3:15 - 4:45 pm   **INTEGRATION OF HEALTHCARE II; INTEGRATION**   *Room 411 B*
     OF ELECTRONIC PATIENT RECORDS AND TELEMEDICINE

     Chair: Linda Weaver

3:15 pm   ABSTRACT 107
Telemedicine's Next Generation - Medical Management
James E. Herrewynen
Mitra Imaging, Inc. Waterloo, Ontario, Canada

3:30 pm   ABSTRACT 108
A Standardised Teletriage Assessment Program for
Remote Referral of Patients to a Heart Center Using a
Secure Province-Wide Network
Richard Scott, Robert MacDonald, Krisan Palmer, David Garnett
Institute for Health Research,
St-John Regional Hospital, New Brunswick, Canada

3:45 pm   ABSTRACT 109
Children's Telehealth Network:
Successful Integration and Implementation of
TeleHealth - The Fredericton Experience
Colleen Rogers, C. Russell, C. Ingram
TecKnowledge Healthcare Systems Inc,
Halifax, Nova Scotia, Canada

4:00 pm   ABSTRACT 110
Challenge: Implementing Telehealth Solution:
A Self-Directed Telehealth Learning Guide
Chris-Anne Ingram
IWK Grace Health Center for Children,
Women and Families, Halifax, Nova Scotia, Canada

4:15 pm   ABSTRACT 111
Business Case Analysis in Telehealth
Dorothy Spence, Linda Weaver
TecKnowledge Healthcare Systems Inc.,
Halifax, Nova Scotia, Canada

4:30 pm   ABSTRACT 112
Effectiveness of Telelearning for Community Nurses
in Remote Areas
Marilyn Hebert, Janet Helmer
University of Calgary, Alberta, Canada

| 3:15 - 4:45 pm | **BREAKOUT SESSIONS** | *Rooms 409, 410, 411 A, 411 B, 411 C* |

| 3:15 - 4:45 pm | **TELEHOMECARE II** | *Room 411 C* |

Chair: Paul Dick

3:15 pm

ABSTRACT 113
Tele-HomeCare: How Does the Model Apply Across Canada
NL Young, W Barden, P Dick, S LeFort,
C Njissen-Jordan, G Rogers, S Lowen
The Hospital for Sick Children, Toronto, Ontario,
Alberta Children's Hospital, Calgary, Alberta,
Memorial University, St-John's, Newfoundland, Canada

3:30 pm

ABSTRACT 114
Pediatric Tele-HomeCare: A Collaborative Partnership
for Children with Intermediate Intensity Health Care Needs
Johanne Carbonneau, Lesley Collins
The Hospital for Sick Children, Toronto, Ontario, Canada

3:45 pm

ABSTRACT 115
Hospital Managed Care of Children in their Homes
Yrjö Palmquist, Annika Eng, E. Rylander, M. Fagerberg,
H. Bergius, B. Lundell, T. Gut, U. Jacobsson
Astrid Lindgren Children's Hospital, Stockholm, Sweden

4:00 pm

ABSTRACT 116
Clinical Evaluation of Home Asthma Telemonitoring
Joseph Finkelstein, George O'Connor, Robert H. Friedman
Boston University, Boston, MA, USA

4:15 pm

ABSTRACT 117
TeleHomecare Research Outcomes from Kaiser Managed
Care Health System: Effects of Remote Technologies on
Access, Quality, Costs and Patient Satisfaction
Barbara Johnston
Kaiser Permanente, Sacramento, California, USA

4:30 pm

ABSTRACT 118
Synchronous Telemedicine Applications for Child
Abuse Evaluations
Jay Morris Whitworth
University of Florida and Florida Child Protection
Teams Medical Director, Jacksonville, Florida, USA

5:00 - 5:45 pm	**CLOSING PRESENTATION**	*Room 408*

Chairs: Dr. Steinar Pedersen
Dr. André Lacroix

The Future of Telemedicine: From Mars to Mainstreet
Dr. Jay H Sanders,
*President Global Telemedicine Group,
and Past President ATA, USA*

Year 2001 ISfT Meeting - Uppsala, Sweden
Dr. Anders Fagerlund

Closing Remarks
Dr. Mamoru Watanabe
Dr. Steinar Pedersen

6:00 - 7:00 pm	**BUSINESS MEETING ISfT**	*Room 408*

THE CANADIAN SOCIETY OF TELEHEALTH - YEAR 2000 AWARDS

A.M. HOUSE, C.M., M.D., LL.D, FRCPC
Lieutenant Governor of Newfoundland and Labrador

Born in Newfoundland. Graduated from Dalhousie University, MD, 1952. He spent two years in General Practice (1952-54) followed by postgraduate training in Neurology at the Montreal Neurological Institute with certification in Neurology by the Royal College of Physicians and Surgeons of Canada in 1959. He was admitted to the Fellowship of the College in 1972. He practised as a Neurologist from 1960 to 1997.

He was involved in hospital and medical school administration from 1966 - 1992, including responsibility for the Continuing Medical Education programme at Memorial University of Newfoundland for twenty years. He played a major role in the development of the University's's Medical School and Health Sciences Centre.

From 1977 to 1992, he was Associate Dean for Clinical and Professional Affairs at Memorial University's Medical School. He was appointed Professor of Neurology in 1973.

He was Chairman of Telemedicine (1966 - 1996) and of TETRA (Telemedicine and Educational Technology Resources Agency) of Memorial University from 1986 to 1996.

He was appointed Special Advisor, Office of the President, Memorial University of Newfoundland, 1993 to 1996.

He has been interested in telemedicine and distance education since the early '70's, and was the leader of team at Memorial University involved in the development of a major telemedicine programme which is nationally and internationally recognized. International projects involved East Africa and the Caribbean and other countries.

Dr. House directed numerous health and education research and development projects covering a wide range of technologies, including medical data transmission, remote consultations and distance education for health professionals. He developed a province-wide audio teleconference network which is regarded as a model system. He has had extensive experience in satellite and ground-based health and education communications systems. Telemedicine work has included applications in marine and offshore oil development as well as in Canada Space Programme.
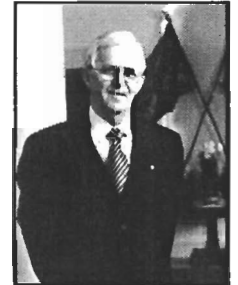
A.M. HOUSE

He carried out a number of international projects and demonstrations as a member of the Board of Directors of SatelLife - an international, non-profit organization devoted to the improvement of health communication worldwide. The Healthnet project of SatelLife had micro-sat ground stations in more than 15 countries.

Dr. House was a Faculty Member of the International Space University (ISU) summer session in Barcelona in 1994.

Dr. House was appointed Lieutenant Governor of Newfoundland and Labrador on 5 February 1997. He has maintained an academic interest in telemedicine and distance education. He also has a special interest in the promotion of literacy and education as a fundamental component of economic development and an acceptable quality of life in a country.

THREE DECADES OF TELEMEDICINE: SUCCESSES, DISAPPOINTMENTS AND LESSONS LEARNED - A PERSONAL RETROSPECTIVE.

A.M. House, C.M., M.D., LL.D., FRCPC, Chairman of Telemedicine
Memorial University of Newfoundland (Retired)

Early telemedicine activities at Memorial University of Newfoundland included the use of telecommunication to support continuing medical education. Later, participation in Canada's space programme in the mid 70's included satellite delivered education, medical data transmission and teleconsultations. The full motion analogue video systems used, while highly effective, were considered at that time to be prohibitively expensive for practical use and efforts were directed to the development of a Province-wide cost effective multi-use audio conference network. Twenty years later, this facility is still in operation and it has always been economically self sustaining.

With the convergence of telecommunications and «informatics» in the 80's, digitization lead to the use of multimedia, video conferencing and delivered necessary bandwidth on demand. Store and forward techniques satisfied many needs. A range of provincial, national and international projects continue to be developed at the Telemedicine Centre.

This paper will review lessons learned and discuss guidelines which were followed.

THE CANADIAN SOCIETY OF TELEHEALTH - YEAR 2000 AWARDS

Professor Louis Lareng

Professor Lareng is a Professor of Medicine in Anesthesia and resucitation at Toulouse University Hospital. He played a key role in setting up France's National Medical Emergency Vehicles System (SAMU)

He has been the President of Sciences of Paul Sabatier University Hospital of Toulousse and held several elected functions in municipal, regional and France's Parliament.

In 1989, Professor Lareng founded the European Institute of Telemedicine in Toulouse. This centre of excellence has a major impact on the organization of Heath Care delivery in the Midi-Pyrénées region in France and also established numerous international collaborations in telemedicine.

Professor Lareng has held numerous functions in National and International Committees and received numerous awards, including The Legion of Honor, France's National Order.

Louis Lareng

THE SUSTAINABILITY OF TELEHEALTH IN MIDI-PYRENEES
PROFESSOR LOUIS LARENG*

The work carried out since 1989 by the European Institute of Telemedicine at the regional, natioanl and international levels, has clearly highlighted the added value of Telemedicine in networking professonal practice thanks to exchanges, cooperation and coordination links between different structures and health actors remote from one another.

The practice of Telemedicine in the Midi-Pyrenees region which is the largest in France (8 departments-45 000 km2-2,5M inhabitants) has been developed with a mulitdisciplinary approach. Telemedicine is meant to pool skills and to involve all the medical and surgical specialities necessary to conduct exchanges. Such an approach is in line with the regional health organization as defined in France by the Regional Health and Social Schemes aiming at improving and ensuring proximity care. Hospital care can thus be better adapted and consistant with regional development policies. Bearing on the results of a 46 month's global experience carried out in the "pioneer" sites of the Regional Telemedicine Network and dealing with 2880 medical records and 24 medical and surgical specialities, we can say that Telemedicine contributes to optimize medical diagnosis and therapeutic approaches and to disseminate the most efficient practices. Complimentary medical skills, multidisciplinary discussions and teh transfer of know-how amont health professionals are part of this success which facilitates the quality and security of care and an easy access to health networks. The optimization of proximity care and a decreased number of medical transfers are also significant results. It would be unfair not to mention the part played by Telemedicine in interactive continuing education schemes to the benefit of health professionals. This practice will only become permanent if formal relationships are established between the involved institutions and if a high level of medical coordination is achieved. Such an inititative should bring the public and the private sector closer to each other and facilitate access to the network for the family doctors. The group of Sanitary Cooperation which is a new legal framework for the cooperation between health institutions seems to be the best suited solution. The memorandum of the group called "Telemedicine Regional Network - GCS RTR" was approved by the Director of the Midi-Pyrenees Regional Hospital Agency on September 14th 1998 and made official on March 27, 1999. This group should weave a "Telemedicine net" between all the health intitutions. One of its goals consists in defining the guidelines for Telemedicine activities at the regional level and the contents of forthcoming exchanges. The technical, financial, legal, regulatory and organization aspects inherent to Telemedicine will also be determined at this level. Moreover, the criteria for the recognition of Telemedical activities and their rating will have to be made clear in order to foster the development of Telemedicine. All this means that health professionals will have to get acquainted with a new working mode based on partnerships and on well-graded coordinated networks. Globalization does away with barriers and questions vertical working modes. We are convinced that the GCS RTR can supply grassroot experience for designing and defining new organization models best suited to the networks of our Information Communication Societies.

"Director of the European Institute of Telemedicine-CHU Toulouse-France
President of the Sanitary Cooperation Groupment-Regional Telemedicine Network (GCS RTR)

HEALTHCARE DELIVERY IN YEAR 2050: THE IMPACT OF TELEMEDICINE

Dr. Ricky J. Richardson, Chairman - UK Telemedicine Association

By the year 2050, healthcare delivery mechanisms will be unrecognisable compared to the present day.

The infomedia age will have made medical resources presently only accessible to a tiny minority of the global population, available to all.

The technology to support this change will have "bedded down" and the long term consequences of this radical reform will already be apparent.

Global healthcare outcomes will have improved, resulting in increasing population pressures most especially at the older age spectrum. These sequelae will require challenging solutions.

The consequence of the unravelling of the human genome will mean that genetic modification will be normal practice.   The ageing genes will be controllable in their expression and oncogenes will be both recognisable and managed.

Space exploration will require "cosmic" medicine embodying many of the telemedicine principals being established today. Robotic surgery will be common place and constant personal monitoring of biometric parameters will be standard.

These changes will be described and the challenges that they bring will be discussed. The talk will be both provocative and thought provoking in an attempt to stimulate rational discourse.

TELEMEDICINE IN NORWAY FROM EXPERIMENTS TO INTEGRATION

STEINAR PEDERSEN, M.D., National Center of Telemedicine
University Hospital of Tromsø, Norway

Telemedicine applications based on video conference systems are in regular use in more than 300 Health Care Institutions in Norway. The bandwidth used is 384 Kbit/sec for diagnostic work. The medical fields involved are dermatology, otorhinolaryngology (ENT), psychiatry, echo cardiology, radiology and pathology.

Videoconference based distance teaching is used between doctors, nurses, physiotherapists, occupational therapists and others.

Off line services are gradually replacing the videoconferencing system because of the off line transmissions are more easily adapted into the working environment of the health care workers. In this way multimedia based patients information within the fields of hart murmur, ophthalmology, dermatology, ENT, gastroenterology and otoaucustic emissions are in regular use.

The different technical solutions are good enough to secure a qualified medical examination and diagnose. The patients are satisfied. The reimbursement issue is solved, and the laws for such services are suggested.

A national Health Care Network is under construction. It is a national aim that all the national hospitals and GPs are going to be connected to this network The network is based on Internet technology. All the national telemedicine services are going to be a integrated part of this network.

MALAYSIAN APPROACH IN DEVELOPING A NATIONAL HEALTH INFRASTRUCTURE

Dr. Abu Bakar Suleiman, Director General of Health Malaysia

The Ministry of Health of Malaysia has developed an Information and Communication Strategic Planning as well telehealth info and infrastructure blueprint in the 1990's. In planning this, the national vision, health vision and health goals were examined. These were later translated into outcome focused health service deliverables and the proposed infrastructures assisted in managing and delivering as well as supporting in disease surveillance, prevention and health promotion programmes.

ALBERTA TELEHEALTH PROGRAM

Dr. Trevor Cradduck, Director of Telehealth, Alberta Wellnet

The delivery of healthcare in the Province of Alberta faces some interesting challenges in terms of both demographics and geography. About 60% of the population resides in the two major cities of Calgary and Edmonton. The remaining 1.3M residents of the province reside in rural and, in many cases, very remote areas. In order to improve access to healthcare for these residents a province-wide telehealth program has been initiated.
The Alberta Telehealth Program had its genesis in the early 1990's when
Several pilot projects were implemented. Based on the success of those projects a decision was made to consolidate resources and implement a provincially coordinated program. It was most fortunate that an anonymous donor was prepared to support the program and, as a consequence, all 19 Health Authorities in the province have access to capital funds and some operational support. To date twelve of the Health Authorities have taken advantage of this funding and more
than 60 video conferencing sites are installed across the province.
An aggressive program to install teleultrasound is also underway with fourteen sites installed so far. This presentation will outline the challenges facing the telehealth program, some of the lessons that have been learned and provide some keys for success that may be helpful to others considering implementation of programs of similar scope.

Trevor.Cradduck@health.gov.ab.ca

TELEMEDECINE IN JAPAN

Shigekoto KAIHARA, Director, The Medical Information System Development Center, Tokyo, Japan

Since 1971, many telemedicine projects appeared in Japan, supported by R&D fund. But most of them were terminated when the fund became unavailable. Unclear legal justification was another reason why physicians did not accept telemedicine. In 1997, the government issued a statement that telemedicine does not violate Medical Law. Now telemedicine is gradually entering in real clinical settings especially in homecare. The present important issue in telemedicine is to show the economical feasibility of this new technology.

CYBERSESSIONS™ IN CONTINUOUS MEDICAL EDUCATION

Roger Simard, CEO, Conceptis Technologies, Montreal

Every quarter Conceptis Technologies webcasts multimedia programs called CyberSessions to thousands of online users, most of them healthcare professionals. Speakers employ audio and synchronized images. The audience joins in panel discussions via their keyboard. Only a computer, Internet access, and a web browser with standard plugins are required.

As we are learning here at the International Society for Telemedicine, medical information of all kinds is moving to the Internet because of its near-universal access, convenience, flexibility, speed, and price. This includes patient education, professional consults, grand rounds, second opinions, patient data, payment records, continuing professional education, research, drug and device development -- all of these information/communication needs are migrating to Internet-based applications in a massive way. In fact, information will soon be designed first for the Internet and secondarily for traditional channels.

A good example, our Medical CyberSessions, exist only on the Internet and CD-ROM. They deliver professional education with both excellence and multimedia excitement, and have many other potential uses, including intra-organizational knowledge upgrades and conferencing.

The speed of communication among medical leaders has created online "communities" of medical specialists. Email, Usenet, chat, and Web, Internet-based technologies bring these communities to real life, often in real time. Notably, since November 1999 the website theheart.org and its related CyberSessions and email lists have helped to create an online community of more than 18,000 cardiovascular medicine specialists worldwide.

In 1999 our Medical CyberSessions won two multimedia awards at Cannes. In 2000 we have developed a second-generation, video-enabled version of this application, CardioCast, in order to expand the range, depth, and versatility of this promising educational technology. We anticipate the first public CardioCast before the end of the year.

GLOBAL TRAINING WITHOUT DISTANCE LEARNING

Ronald E. LaPorte, Ph.D.

How do we improve global teaching? We use better lectures. How do we get better lectures? We create a open source system to share lectures world wide for free.

During the past 3 years we have joined 1540 academic experts in epidemiology, global health and the Internet and had them develop a library of lectures. This library consists of 170 leading lectures that can be taken out for free by anyone world wide. It is designed to provide state of the art lectures for all to use, with Demining based statistical quality control procedures. This research effort has been funded by NASA, and is now being developed by a grant from the National Library of Medicine.(www.pitt.edu/~super1)

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Director, Disease Monitoring and Telecommunications
WHO Collaborating Center
Professor of Epidemiology
Graduate School of Public Health
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Telephone: 412 383 2746

THE USE OF TELEMEDICINE AND INTERNET IN SURGICAL TRAINING:

J Marescaux EITS/IRCAD Hôpitaux Universitaires BP 426, F 67091 Strasbourg Cedex France

The information age is revolutionizing the practice and education of surgery. Video-conference systems already links surgeons around the world with the only limitation of simultaneity. The European Institute of Telesurgery (EITS) has developed an international communication network between surgical centers in Europe, America and Asia. Pre and per-operative surgical advice may be obtained from these centers. Teleeducation, teleteaching, teletraining, telementoring are now common practice between EITS and these centers. Surgical simulation has also been developed for the training of surgeons in hepatic surgery, that requires a long apprenticeship. Data extracted from patient's CT scans are reconstructed as virtual tri-dimensional images by computer. The surgical procedure can then be simulated for surgical training and to determine the best hepatectomy according to the lesions. Since tactile information is of major importance in surgery, we have also developed a force feedback system providing five degrees of freedom. Finally, in order to provide surgeons with all these information whenever and wherever necessary, the internet WeBSurg project was launched by EITS. All the multimedia applications required for an attractive, interactive and entertaining presentation using streaming video and audio, Web forums and chat rooms will be used around a "World Virtual Encyclopedia" of surgery. According to the recent recommendations expressed during the "Internet Healthcare 2000",WeBSurg is user-friendly and respects cultural and linguistic differences, being translated in 10 languages. However, it remains to be accurately demonstrated that all these means will allow improvement in patient care.

LINKING SPACE- AND TERRESTRIAL MEDICINE

Dittmar Padeken and Rupert Gerzer, Institute of Aerospace Medicine, DLR, Linder Hoehe, D-51147 Cologne, Germany.

Space medicine has the main task to bring expertise and individual help to a possible patient who is away from the medical expert and from medicial expertise. This is also the ultimate task of terrestric medicine. Future will more and more allow the patient to remain at home or to travel, but still receive high class medical assistance. Therefore, the Astronaut can be viewed as a symbol for the task of medicine of the future.

This task has three components. First, new developments in technology development make it possible to develop non-invasive technologies for diagnosis and treatment and allow to provide intelligent systems for data storage and handling. This field incorporates present developments in telemedicine. The second field analyses the human genome and provides clues for molecular diagnosis and for targetting individual genes as a basis for individual-ized health care and medicine. The third field brings together data in a systems view and incorporates details into personalized guides and suggestions for individual humans. While we are far off from resolving the third task, we make rapid progress on the technology and on the molecular frontiers. These are the bases for the ultimate per-sonalized medicine, which incorporates the whole human person and will be an important guide not only for treat-ment, but already for prophylaxis.

An important basis for all these tasks is a platform, which allows to eventually build a life-long patient record, that is secure and accessible from any location where needed. Such a life-long record should eventually contain possi-bilities for medical guidelines, for individualized suggestions and to eventually become a personal guide for an individual person.

In our work, we therefore concentrate on such a platform. This telematic platform is at present used in model proj-ects as a distributed electronic patient record form to link practitioners and hospitals in order to have any informa-tion on an individual patient when this information is needed. The platform will also be used to care for European Astronauts during training in different parts of the world and during stays on the International Space Station.

In summary, space medicine more and more has the task to develop tools that are important and necessary for the future of medicine.

THE APPLICATIONS OF TELEMEDICINE AND TELEHEALTH IN NASA

Charles R. Doarn, MBA
Medical Informatics and Technology Applications Consortium
Virginia Commonwealth University

Telemedicine continues to be an integral part of the delivery of health care in space. In the early days of space travel, telemedicine was principally the transmission of physiological parameters of astronauts in spacecraft or space suits, while on the lunar surface, to Mission Control in Houston, TX. In the past three decades, telemedicine has emerged as a useful tool in numerous applications on Earth. These have included evaluation of technologies in remote regions such as Mt. Everest and in response to natural disasters. Since 1989, NASA has sponsored a number of telemedicine activities, which have championed a paradigm shift in telemedicine. These have included the Spacebridge projects, the establishment of a commercial space center (CSC) focused on telemedicine, a virtual collaborative clinic, and a robust tele-education program. The Medical Informatics and Technology Applications Consortium, a CSC, is focused on developing and conducting test beds to evaluate and validate telemedicine tech-nologies. Telemedicine is a significant adjunct to the practice of medicine in space. As humans travel to space and begin to explore planets like Mars, the integration of smart system and information systems will permit autonomous medical care millions of miles from the Earth.

THE RUSSIAN EXPERIENCE IN USING TELEMEDICINE IN THEIR SPACE PROGRAM

Oleg Orlov, MD, PhD, Space Biomedical Center for Training and Research, Moscow, Russia

The major challenge of space biomedicine has been the development of methods and procedures that can help space crews maintain good health and high performance in missions. Currently, the ground medical personnel can monitor the health condition of crewmembers, predict its potential changes, recommend therapeutic measures and assess their efficiency, using primarily downlinked data, telemedicine test procedures, onboard countermeasures and medical kits. We applied telemedicine methods to diagnose several health problems and injuries, when the use of telemedicine methods allowed us to treat the clinical cases efficiently and to avoid changes of the flight schedule.

Introduction of space technologies into practical healthcare, started in the framework of the Russian Space Agency - NASA cooperation, turned the Space Biomedical Center for Training and Research into the leading Russian institution in the field of telemedicine. Owing to the Center activities, telemedicine became one of the priorities in the national medicine policy, the fact made possible to develop a project of creating a telemedicine services system in Russia and to establish the national «Telemedicine» foundation supported by the governmental structures for the project realization.

It's no doubt that the priority project of the near-earth space exploration in the coming decenaries will be building up of the International Space Station (ISS), where the importance of remote monitoring and distance support of the crew members activities by the earth-based services of medical control attracting, if necessary, different clinical medicine specialists, will increase. The efficiency of response in such cases may be maintained only on the basis of modern telemedical systems. The international character of the ISS gives a special importance to the current work on integrating systems of medical support of the participating countries. In spite of the transparency of the international cooperation in the framework of the ISS the space research programs require to follow the biomedicine ethics and confidentiality of the special medical information exchange.

At present we have technical facilities for creation such a system. In Russia activities on building a telemedicine network for the Russian node of the ISS are carried out by the State Scientific Center of the Russian Federation – Institute for Biomedical Problems, the Space Biomedical Center for Training and Research, Mission Control Center of the Russian Space Agency, and Yu. Gagarin Cosmonaut Training Center.

It's evident that during a space flight to Mars biomedical problems will be much more difficult in comparison with the orbit flights of the same duration. The summed up factors of interplanetary flights make it necessary to develop a special system of telemedical support with an accent on the on-board facilities. In the future such systems will be developed on the base of the information technologies integration with biology as well as physics and chemistry, what will mark a new interdisciplinary technological breakthrough.

QUEBEC PEDIATRIC TELEHEALTH NETWORK: A MODEL FOR TELEMEDECINE IMPLEMENTATION

Alain Cloutier, MD
Paediatric cardiologist, coordinator of the Réseau Québécois de Télésanté de l'Enfant;
Head of telemedecine service, CHUL, Centre hospitalier universitaire de Québec (CHUQ), 2705 blvd Laurier Ste-Foy,Québec,G1V 4G2
Alain.cloutier@chuq.qc.ca

The Quebec Paediatric Telehealth Network integrates telemedecine in 36 hospitals including 4 University Hospitals for the benefits of children of the entire province. Real-time echocardiography for paediatric cardiology consultations was the first application of the network. Previous experiments in that field already evaluated the technical, professional and economical issues.
In all network centres, bi-directional audio-video communications allow visualisation of the technician, physician, patient and parents and facilitate the exchanges between the medical teams. A bandwidth of 442 or 512 kbps is dedicated for telemedecine telecommunications network that connects Quebec's health care establishments. So far, more than 85% of the patients examined by the telemedecine network do not need to be transferred.
All levels of authorities in the health care system are involved and act in concert for the different issues of implementation and sustainability of such a large network. Other applications will be introduced according to the needs and the physicians desire to participate.
 This model of telemedecine implementation confirms that realisation and sustainability of such projects depend on a clear identification and understanding of the needs, the good will of all participants, and the strength of the organisation that support the network.

TORONTO SICK CHILDREN TELEHEALTH PROGRAM AND INTERNATIONAL CONNECTIONS

Dr. Robert Filler*, Director of Telehealth, The Hospital for Sick Children, Toronto

The Hospital for Sick Children began its program in Telehealth in 1995. The program has evolved from distance consultation to include education and training and Tele-home care. It is coordinated with other hospital programs in the broad categories of Telehealth which include information transfer and electronic medical records, nurse call centers, and health information for the consumer. The outline of the presentation presented below will be followed to demonstrate these various aspects of the program. In addition future plans of expansion and integration of Telehealth into the delivery of health care will be presented.

Medicine at a Distance
o Telehealth/Teleconsultation in Ontario, Canada and around the world.
o Telepsychiatry

Education and Training
o IATV Tele-education. Regular meetings/rounds between a multitude of health care providers in Canada and
   abroad.
o Professional forum (PROFOR) offered by the electronic child health network(e-CHN)
o Hospital for Sick Children Website

Information Transfer
o e-CHN Health Data Network
o PACS
o Fetal Diagnostic Centre Database

Monitoring/Telecare/Triage
o Tele-home care Project
o Call Centers MIC/PIC
oTrans Telephonic Cardiology

Health Information
o Call Centers-MIC/PIC
o Motherrisk Call Centre
o e-CHN: Your Child's Health
o HSC Website
o HSC TV

WHEN STATE-OF-THE-ART TECHNOLOGIES BECOME COMMUNITY-ORIENTED

Mrs. Suzanne Robichaud, RN, Corporation Beauséjour, Moncton, New-Brunswick

A telemedicine pilot project in Nephrology at the Dr. Georges-L. Dumont Regional Hospital in Moncton, New Brunswick, Canada, is underway since May 1998. It is the only Nephrology telemedicine program in Canada that includes research projects
and evaluation activities. The major component of this project is the innovative use
of communication technology to link nurses, nephrologists, and other members of
the multidisciplinary team to patients in various settings. To this end, video technology is used to link the Dr. Georges-L. Dumont Regional Hospital to: 1) a satellite hemodialysis unit in a remote area, 2) a hemodialysis unit in another hospital, and 3) an aboriginal community health facility with a focus on illness prevention. Computer technology is used in conjunction with video technology for the purpose
of patient diagnosis and monitoring; storing and accessing radiology results; consultation; multidisciplinary case conferencing, and staff and patient education. Dialysis data from home hemodialysis patients and the satellite dialysis unit is also accessible electronically.

This presentation will focus on the 18 month experience prior to the launch: the
lessons learned, some outcomes, future opportunities. The strength of our program
is based on its community orientation - it reaches out to First Nation people and other communities - and the integration of state-of-the-art technologies with existing systems currently used in participating hospitals.

Ms Suzanne Robichaud, RN
Corporation Beausejour, Moncton NB, Canada

FIRST NATIONS TELEHEALTH RESEARCH

Mrs. Alexa Brewer, Director MSB, Health Canada

First Nations and Inuit telehealth is a distinct component of the Canadian Health Infostructure that will require partnerships with new and existing networks/programs to ensure its success. The need for telehealth in First Nations and Inuit communities was demonstrated in the National First Nations Telehealth Research Project. To be completed in March 2001, the project is intended to test a variety of telehealth applications in five pilot First Nations communities. Perhaps more so than the evaluation results, the greatest contribution of the National Project will be the many lessons learned during its implementation. These lessons are tied to critical issues that will need to be addressed in a Strategic Vision for the potential future of telehealth in First Nations and Inuit communities. The vision will be created by First Nations and Inuit decision-makers and community health providers. It will establish a strategic framework to consult and educate communities, to develop policies and to build partnerships and infrastructure.

TRAUMA TELEMEDICINE AND BEYOND: THE MANY FACETS OF TELEHEALTH IN B.C.

Kendall Ho, MD FRCPC
Associate Dean and Director, Division of Continuing Medical Education
Assistant Professor, Division of Emergency Medicine
Faculty of Medicine, University of British Columbia

For rural health professionals, the management of trauma is often unnerving, because of low volume of exposure and yet high acuity of the majority of cases. Rural nurses are often the first contacts to initiate resuscitation of these patients, followed by on call rural general practitioners and specialists. Having an entrenched and multimedia access to trauma consultants on demand would conceivable be ideal to assist these health professionals in their management and possible transfer of these trauma patients. Coupling the trauma consultations with CME, both in real time during case management and later on in scheduled rounds would be a powerful educational intervention.

The Division of Continuing Medical Education, the Vancouver Hospital trauma services and the Vancouver Hospital Emergency Department are collaborating with the Cranbrook emergency medicine group of physicians and nurses for the experimentation of trauma consultation and CME rounds via telemedicine technologies. The methodologies and outcome evaluation will be discussed in more details during the presentation. Using CHIPP grant competition as an opportunity, our group has jointly submitted an application with the Health Association of B.C. and the B.C. Children and Women hospital to offer multidisciplinary telemedicine services to various communities in B.C. The trauma component will first concentrate on the expansion of delivery of services to the North West and the South East. Over time, we will expand to other locations, based on the concurrent development of telemedicine infrastructure in our province.

Finally, a brief discussion of some of the representative telemedicine activities in B.C. will be carried out. It is not meant to be exhaustive, but merely an impressionistic reflection of the diversity of interest and activities in telemedicine that are evolving in our province.

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THE CONVERGENCE OF TELEHEALTH AND E-DISEASE MANAGEMENT: EMERGING SUCCESSFUL BUSINESS AND CLINICAL MODELS.

Vince Kuraitis

Internet health analysts initially divided the world of e-health into 3 or 4 "C's", usually Content, Connectivity, and Commerce (and sometimes Community). More recently, many analysts have added another "C" – Clinical Care. There are over 150 companies directly addressing the disease/care management space, and dozens more rushing in. These include disease management outsourcing vendors, telehealth companies, ehealth content companies, providers, pure-play Internet disease management companies, Internet personal health record companies, and others. Which ones are building successful business, clinical, and technology models? Which ones are most appealing to consumers? The presentation provides both a conceptual framework and specific case examples of the most successful Internet disease/care management approaches.

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CO-OPERATIVE SECURE HEALTHCARE NETWORK

Dittmar Padeken, Erwin Bartels, Katja Bethke, Juergen Novotny, Hendrik Reinke, Dirk Schwartmann, Michael Wirtz, Institute of Aerospace Medicine, DLR, Cologne, Germany

Co-operative, integrated care, crossing physical and economical borders of care facilities requires careful preparation and needs to consider professional, ethical, technical and economical aspects.

In order to facilitate the collection of these experiences a model project for a co-operative healthcare network for integrated care is under development in the area of Cologne/Bonn, comprising 45 practices of 10 medical specialities, 3 focal practices for nuclear medicine, 4 regional hospitals and one university clinic.

The initial network is based upon a health telematics platform that provides certain initial services such as
o a security infrastructure with smart cards and trusted third party services
o virtual, distributed electronic health record for the patient
o electronic prescription
o integration of "Legacy Systems"
o portability of information contents and relations by XML
o portability of applications by component based implementation with Java
o broadband virtual private network including Internet access and mobile access technologies

The initial phase of the model project will last three years - sustainability of the network
will be achieved by establishing a business plan for the continuous operation of the network.

The model project is supported by the health professional organisations, health insurances, the health minister of the federal state Northrhine-Westfalia the Aktionsforum fuer Telematik im Gesundheitswesen (ATG) and the German Society for Health-Telematics-IGD e V..

ONLINE HEALTHCARE: SMART INTERNATIONAL PARTNERSHIPS

Lun, K. C., Medical Informatics Program, National University of Singapore (email:kclun@nus.edu.sg)

A recent survey reported in the July 24 Asian Edition of BusinessWeek found that one-third of patients suffering from chronic diseases reported taking their medications more regularly after checking out information on the Internet. Also patients who share the same ailment are forming online communities to exchange experience and advice on the management of their disease as well as pressure groups to lobby for more research funding for their disease. These and other findings on professional and consumer reliance on the Internet for health information and e-commerce on prescription drugs and health products point to the increasing use of the Internet in health and healthcare and its ability to revolutionize the health sector by connecting people, information and services across geographical regions. With the many initiatives that are currently taking place around the world to provide online healthcare, both in academia and in industry, the next phase of online initiatives should examine the consolidation of information services to facilitate sharing and technology transfer. Already, several of these initiatives have been started. In academia, for example, the University of Pittsburgh Supercourse provides an Internet-based learning resource in epidemiology for developing countries using materials voluntarily contributed by experts around the world. A S* Alliance to offer a global joint teaching program in bioinformatics involving universities of 5 continents provides a consortium model for the pooling of resource as well as fee-sharing. In industry, smart international partnerships are necessary to venture into niche markets and/or synergistic alliances. A non-Asian based online healthcare provider wishing to expand its services into Asia would find it strategic to work with an Asian partner who knows local and regional consumer market needs and demands. Yet another smart international partnership can occur when companies with differing strengths and capabilities find it strategic to pool their resources to address today's increasingly sophisticated market needs. For example, a company that runs a health portal for disease management may find that it can provide a more value-add service than its competitors by partnering another company that has developed monitoring technology. Such a strategic partnership will not only allow consumers to find out more about their diseases but also give them the capability to monitor and manage their own condition. As networking is the key to strategic partnerships, a global organization like the International Medical Informatics Association (IMIA) with its over-50 national member associations distributed into 4 regional groups worldwide can provide strong catalytic support to the formation of a telehealth consortium through its many working groups such as WG18 on Telematics in Healthcare. Its regional group for the Asia Pacific, the Asia Pacific Association for Medical Informatics (APAMI) has, in fact, initiated a Telemedicine Consortium in 1998, in collaboration with the Asia Pacific Advanced Networking Consortium (APAN). Countries, industries and organizations should therefore leverage on these initiatives to establish smart international partnerships for online healthcare.

Evaluation of Telemedicine in Year 2000

Dr. Rashid Bashshur, President American Telemedicine Association and Editor-in-Chief, Telemedicine Journal, University of Michigan, USA

This presentation will focus on critical issues in telemedicine evaluation,
including scientific and policy requirement and empirical findings to date.
It will contentrate on issues related to methodological requirements for
valid research in this field as well as policy relevant evaluation. Suggestions will be made regarding fruitful future directions for telemedicine evaluation that can guide policy formulation and optimal development.

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GLOBAL TELEMEDICINE INITIATIVES AT EAST CAROLINA UNIVERSITY

David C. Balch, Director, The Telemedicine Center

The Telemedicine Center at East Carolina University (ECU) is developing an intelligent bridge with global connectivity to improve processes for delivering medical assistance during man-made and natural disasters. Funded by NIH/NLM to develop telemedicine for Next Generation Internet, ECU is also building its Distributed Medical Intelligence model through exercises like Strong Angel to expand and refine the practice of cyber medicine.

TELEMEDICINE AFTER THE INFORMATION AGE: THE BIOINTELLIGENCE AGE

Richard M. Satava, MD, Department of Surgery, Yale University School of Medicine,
New Haven, CT

Telemedicine is the hallmark of the Information Age in Medicine. But a new era is emerging, the Biointelligence Age. This is the combination of the biologic, physical and information worlds into single entities. Revolutionary technologies and fields of bio-sensors and bio-materials (bio+physical), biocomputation and bio-informatics (bio+information) and MEMS microsensors and distributed networking (physical + information) have redefined the direction of the future. Combining all three areas results in systems and devices which are tiny, adaptable, embedded and intelligent. These micro-systems will become ubiquitous, embedded in everything (from food, to appliances to our body) and communicate through massively distributed networks. They will be programmable, flexible and transparent to daily living. The result will be to change our world from dumb, unconnected to "smart" and networked.
For telemedicine, these will enable a number of predictions from the past. The hospital, home and workplace will continue to be integrated with information science tools and be networked to the outside world, however this networking will be enabled by knowledge agents which will anticipate the needs of the patient or person or be capable of finding precisely the piece of information needed. Patients will have numerous non-invasive or embedded biosensors that detect both function and biochemical data about their health or disease status to proactively prevent disease either by the person themselves, or through networking to their healthcare providers. Microscopic nanotechnology devices will be used for diagnosis and therapy. The advances in tissue engineering will provide new therapeutic modalities, such as implantation of genetically engineered cells to replace damaged or resected tissues, and the replacement of blood vessels, muscle and even organs with artificially grown and tissue engineered systems. The challenge will be to see how these new technologies can enhance patient care through telemedicine.

TELEHOME CARE: WHERE ARE WE IN YEAR 2000

Dr. Guy Harris, President, Digital Communications Centre, Tokyo, Japan

The 90s saw the development of a number of models and means of telecare, from highly centralised nurse stations to set-top boxes over POTS to specialised real-time units over cable. Many have faded away while others have lasted the distance. In addition, to the surprise of telemedicine, a whole new group of services and ideas have come out of the ehealth world. This presentation will provide a historical overview of the field and attempt to prognosticate on its future direction.

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TELEPSYCHIATRY IN AUSTRALIA

Professor Peter Yellowlees

Psychiatry has been the discipline that has provided most telehealth services in Australia, and significant telepsychiatry project programs are now operating in Queensland, New South Wales, South Australia and Victoria. All of these programs will be reviewed and detailed data will be presented on the Queensland Telepsychiatry Network which commenced in November 1997, and which is now used for about 400 hours per month, with approximately half of this time being for direct patient consultation activity, and the other half for teaching, professional support and supervision. Two specific telepsychiatry projects in Queensland will be highlighted. The first demonstrated clear cost effectiveness in North Queensland of a specialist to Community Mental Health Service series of links. The second, involving links from psychiatrists to general practitioners, demonstrated not only cost and clinical effectiveness, but also showed how integrating educational activities from psychiatrists to general practitioners enhanced the capacity of the general practitioners to manage their own patients in distant communities while needing less backup support over time. With the move of telepsychiatry programs away from traditional ISDN networks to broadband Internet provision, Australia is well placed to take advantage of the new electronically mediated models of mental health care provision because of the very wide spread clinical telemedicine expertise available within the country.

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A SURVEY OF TELEHOME CARE PROJECTS IN JAPAN

Ken Toyoda, Professor of Medical Informatics, International Research Institute of Health and Welfare, International University of Health and Welfare

The necessity of Home Health Care is growing due to increase in desire for health promotion owing to increase in chronic diseases, aged population and medical expenses. Telemedicine System is generally reputed to be one of the most useful tools for Home Health Care.

The 15 cities and towns have introduced Telehome Care Systems which initial instalation costs were supported by Ministry of Health and Welfare. We conduct a survey the evaluation of those projects by municipal staffs, hospital/clinic staffs, patients and theire families.

The results showed that Telehome Care Systems are very useful to increase especially mental satisfaction of patients and theire families. There are the problem of cost share and the skills staff shortage in municipality and hospital/clinic.

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TELEMEDICINE – THE ROLE OF WHO

Salah H. Mandil, Ph.D., Director-Advisor, Health Informatics & Telematics, World Health Organisation, Geneva - Switzerland

The presentation will outline WHO's views on TeleHealth/TeleMedicine and its current and potential contribution to the provision of equitable, quality health care, particularly to the under-served populations. The presentation will be interwoven with a few examples, from the industrially developing countries, of the extent to which TeleHealth/TeleMedicine is being experimented with, demonstrated and indeed practised.

The presentation will also discuss the main issues and trends, and how these are contributing towards the formulation of a WHO Policy and Strategy on TeleHealth/TeleMedicine.

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THE EUROPEAN APPROACH TO NETWORKING

Pr. Jean-Claude Healy, European Commission, Brussels, Belgium

Professor Healy, a medical doctor and doctorate of biophysics, is the Head of Information Society Technologies relating to Health in DG INFSO of the European Commission. He holds the Chair of the faculty of Biophysics and Medical Informatics at the University of St. Etienne. He represents the European Commission in th G7 Information Society Healthcare Applications project (GHAP) and has been consultant for various International Agencies working in the area of Info-Ethics and Standardisation.

OPERATIONAL TELEMEDICINE CAPABILITY IN REMOTE ENVIRONMENTS - PAST, PRESENT, AND FUTURE DEVELOPMENT

COL Ronald Poropatich, MD, Walter Reed Army Medical Center, Washington, DC and the Telemedicine and Advanced Technology Research Center, US Army Medical Research and Materiel Command, Fort Detrick, MD

Since December 1992, a commercial, deployable, telecommunications system capable of satellite transmission of medical images, has been operational. Clinical results of the first two telemedicine prototype consultation systems utilized from 1992-1994, and 1994-1997 will be presented.

In 1997, the U.S. Army Surgeon General developed the Special Medical Augmentation Response Teams (SMART). One specific SMART, the Medical Command, Control, Communications and Telemedicine (MC3T) team, has maintained a high state of readiness capability for the last two years. The mission of the MC3T SMART is to deploy for emergency disaster relief and humanitarian missions that the U.S. Army is called to support. The team is equipped with commercial satellite terminal, cellular phones, a variety of video-teleconference and computer equipment, a generator and an UPS. This allows self-sufficient Internet and telephony coverage anywhere in the world. The team can be deployed within 48 hours and be operational within 15 minutes. The role of the Telemedicine SMART in support of other deployed specialty teams (Trauma/Critical Care and Chemical/Biological detection) will be discussed.

From the experience gained in deploying the North Atlantic Regional Medical Command Telemedicine SMART to El Salvador (Hurricane Mitch Relief), we define the SMART roles and capabilities; review past missions; discuss sustainment issues such as training, cost, and technical limitations; and point out the SMART concept's strengths and shortcomings.

The Telemedicine SMART concept could serve as a model for civilian humanitarian relief agencies. Plans for future development of a lighter and more mobile Telemedicine SMART with new emerging technologies will be presented. In addition, results of a June 2000 meeting among NATO nations in developing a standardized deployable telemedicine system will be discussed.

INTERNATIONAL GUIDELINES FOR TELECONSULTATION

Pr. Michael Nerlich, Head of Trauma Surgery, Regensburg, Germany and the G8 SP-4 working group

These guidelines are intended to provide a general approach to teleconsultation which is internationally viable and generic enough to give interested health care professionals all over the world guidance in adopting and evaluating the use of teleconsultaion.

Teleconsultations are conducted in numerous medical disciplines, in or between many countries, with technological means and safety-standards varying widely. This often makes it difficult to coordinate or compare efforts in this important field of telemedicine. Promoting the development of a global information society the governments of the G-7 countries selected several pilot projects of international collaboration. Amongst those the one on Global Healthcare Applications Projects (GHAP) set the objective to improve quality and cost-efficiency of healthcare delivery through the use of telematic tools. The main objective of sub-project 4 was to enable an international concerted action on collaboration in telemedecine. Science-based methodology and expert clinical judgement based on a three year collaboration of the G-7 Global Healthcare Applications sub-project 4 expert group were used to work out specific statement on teleconsultation.
Consensus was obtained in a nominal group process and through peer review by international experts, developing guidelines for the safe practice of teleconsultation which are based on best-evidence synthesis.

Based on the definition of consultation a generic of teleconsultation is given and the benefits and problems of teleconsultation are discussed. The basic distinction is the one between structural and formal aspects:
Structural aspects include the communicational interaction, a workflow-analysis and the organisational integration into clinical work as well as decision criteria on technological applications from a current perspective.
Recommendations are given which steps to undertake when implementing teleconsultation.
Formal aspects cover the legal matters in the health care professionals' interaction as well as legal matters concerning the patient (authorisation, duties and responsibilities of participants, liability, documentation, data security and data protection, patient's informed consent, cross-border aspects, contracts).

This document provides guidelines for establishing policies and procedures to promote safe high quality application of teleconsultation technology to the practice of medicine.

THE FUTURE OF TELEMEDICINE

Jay H. Sanders, M.D.

Over the past 10 years we have been witness to dramatic transitions in the telecommunication infrastructure, the technical functionality, the clinical applications, the economics and the legal and regulatory environment for telemedicine.

A profile of these changes include:

(1) the conversion from high bandwidth, point-to-point conference room sized systems to desktop and mobile, distributed, networked IP platform-based systems;
(2) "real time" synchronous consultations migrating to "store and forward" interactions;
(3) a predominately rural-based application focus to the provision of home and school-based health care in the inner city;
(4) a healthcare technology affordable only by the industrialized nations to an indispensable enabling technology that is the only affordable solution for developing societies;
(5) from an experimental "proof-of-concept" technology to the basic framework of all healthcare communication;
(6) a movement from a preoccupation with the acquisition and transmission of information to a concentrated emphasis on the integrity and quality of the information being transported, and
(7) the switching of focus from a practitioner-based healthcare system to a patient-empowered and preventive healthcare system and ,in turn, from a patient-based system to a consumer-oriented system.

Given the magnitude of such changes in such a telescoped time frame, we should tighten our seat belt in preparation for what comes next. My glimpse into the future, which should be subtitled, "From Mars to Main Street" will highlight some of these expectations.

001 VALUE OF USING VIDEOCONFERENCING FOR INTRA-REGIONAL MEDICAL ROUNDS

Karen Kroeker, Robert Johnston, Steven Edworthy, Peter Sargious, Penny Jennett, Ming Gao, CRHA;
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Education was identified as the highest priority within the Calgary region when funding became available in Alberta in 1998. The vision was to increase the accessibility of rounds through the use of videoconferencing technology. Room-based videoconferencing equipment was purchased for 2 of the 4 acute care centres. The program began with two medical departments that were interested in using the equipment for their weekly grand and one department for its weekly CPC rounds.

Evaluation of the program was deemed important, as the success of any telelearning program is dependent upon satisfaction of the participants. Participants were invited to complete a one-page satisfaction survey at the completion of each session.

Over a 12-week period, 15 rounds took place with 574 persons attending. Of the 574 participants, 277 completed surveys, which measured technology quality, accessibility, reduced travel, and attitudes toward the program. Only 2/3 of the participants agreed that audio/video quality was acceptable and 25% indicated that they felt distracted by the technology. However, the videoconferencing format increased the accessibility of rounds for 70% of participants. Forty-five percent of the participants indicated that the technology reduced the time/cost of travel. Almost 90% agreed that it was an acceptable format and that they would attend other sessions.

These results indicate that participants are supportive of the idea of using videoconferencing for medical education but feel that the technology could be improved. Furthermore, videoconferencing is able to both increase accessibility of education within an urban region and reduce the time and cost of travel.

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002 LESSONS LEARNED FROM THE CONTINUOUS MEDICAL EDUCATION PROGRAM OF THE QUEBEC INTER-REGIONAL TELEMEDICINE NETWORK

André Lacroix, Pierre Robillard, Mario Dallaire, Marcellin Ayé, Claude Sicotte.
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During an 18 months period, CME activities were organized in a network which linked three regional hospitals to a university teaching hospital using a multipoint interactive H320 videoconference system; six ISDN lines allowed transmission of data, voice, radiology, slides, video at 512 kbps. Sessions were scheduled at 2-week intervals and addressed a topic within one of 13 themes or specialties; each of the 4 centers was invited to present an aspect within the theme. Target audience was mainly specialists, but general practitioners were also invited in regional hospitals; this was the initial exposure to teleformation for the majority of participants. A total of 27 two-hour sessions were conducted out of a potential of 37 dates planned. An evaluation questionnaire was used during the initial 23 sessions. A total of 464 physicians participated from the 4 centers. Participation varied according to the theme and tended to decrease slightly over time. The interactive nature of tele-training was particularly appreciated. Good overall satisfaction was maintained when comparing the initial and late period of activities. Sessions attracted mostly specialists concerned by the topics, but this varied according to each center. Interest of general practitioners was not maintained as they felt that the topics were too specialized. Technical quality of sound with frequent echo problems and the relative lack of spontaneity inherent to the technique were noted as negative points. A similar CME network was also experimented between the university teaching hospital and similar centers in France A series of 11 joint staff sessions generated much interest in the teaching hospital, but did not succeed in recruiting the participation of regional hospitals. Both experiments revealed that designated personnel and significant efforts of coordination are essential to maintain CME activities via a telemedicine network.

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003 VIDEOCONFERENCING FOR CONTINUING MEDICAL EDUCATION: FROM PILOT PROJECT
TO SUSTAINED PROGRAM

Michael Allen, Joan Sargeant, Dalhousie University, Halifax, Nova Scotia, Canada

In 1996 as part of a telemedicine pilot project, Dalhousie Continuing Medical Education (CME) videoconferenced
12 CME programs to each of 4 communities in Nova Scotia. The success of that pilot project led to the Nova Scotia
Telehealth Program (NSTHN), a province-wide telemedicine system. Through the NSTHN, Dalhousie CME has
expanded its videoconferencing activities and in 1999-2000 provided 64 videoconferences to 37 sites throughout
Nova Scotia.

We have found several differences between conducting a pilot project and providing a sustained program. The
most obvious is the increased size and work. Providing regular programs to many sites requires much effort and
coordination. When broadcasting to several sites simultaneously, it is important to satisfy the learning needs of
physicians at those sites in terms of scheduling and program content. Follow-up with physicians at receiving sites
is critical but becomes more difficult as a program grows. Also, it is essential to efficiently train and support fac-
ulty who have little or no experience with videoconferencing. And as videoconferencing becomes more widely
accepted, we must integrate it into existing CME programs. Finally and perhaps most difficult, is obtaining stable
funding to maintain programming.

This presentation will outline the experiences of Dalhousie CME in videoconferencing and the steps we are taking
to provide regular, sustained CME programs by videoconference.

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004 EFFECTS OF AN EDUCATIONAL PROGRAM ON ABORIGINAL PERSONS WITH DIABETES AT RISK OF
DEVELOPING CHRONIC RENAL FAILURE (CRF)

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The objective of this pre-experimental study was to evaluate the effects of distance learning of Aboriginal persons
with diabetes at risk of developing CRF. Out of a total of 53 potential participants, 19 persons received education
sessions, in Mi'kmaq, by two Aboriginal nurses, using live interactive videoconference. A video, created in
Mi'kmaq, by members of the Big Cove community, accompanied the sessions.

Results demonstrate an increase in knowledge and a high level of satisfaction with videoconference. Despite
believing that diabetes is a predisposing factor of CRF, maintaining healthy practices remains challenging for this
population. Further applications of telemedicine in providing culturally-relevant information to members of cul-
tural minority groups will be explored.

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005 **A COLLABORATIVE APPROACH IN DELIVERING CONTINUING NURSING EDUCATION PROGRAMS TO NURSES IN NOVA SCOTIA VIA THE TELEHEALTH NETWORK**

Ann Duncan, Linda Hamilton. Continuing Nursing Education, Registered Nurses' Association, St. Martha's Regional Hospital, Antigonish, Nova Scotia Canada

The Registered Nurses' Association of Nova Scotia (RNANS) recognized that changes in the health care system resulted in changes to the working environment of many nurses. Nurses surveyed stated that there are job related competencies which staff nurses could gain through continuing nursing education most suitably offered at their place of work. Specifically, many nurses requested the provision of more distance education using modern telecommunications technology, and that education should be interactive as much as possible to benefit from the experiences of others.

To address the need for continuing nursing education in the workplace, in 1998 the RNANS, in collaboration with the Nova Scotia Department of Health and the Regional Health Boards was able to access the Nova Scotia Telehealth Network for continuing nursing education. By September 1999 CNE programs were delivered to 38 Telehealth sites across the province. Partnerships were developed with nurse educators and other nurses to determine learning needs, prioritize topics, and identify presenters. Presenters tend to be clinical nurse specialists, expanded role nurses and nurse educators from across the province.

Since its inception in April 1998 and expansion to all regions in the province in September 1999, there were 195 continuing nursing education programs delivered with a total of 3,981 participants of whom 3,053 were nurses.

A summary of quantitative and qualitative data regarding participation statistics and participants evaluation of the content and delivery method is presented.

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006 **FROM SATELLITE TO WEB BASED CME IN EUROPE**

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Continuing medical education (CME) is a professional responsibility of physicians to maintain and update their knowledge base. In Europe, its adoption has been patchy, but the increasing harmonisation and free flow of doctors between member states means that pan-European initiatives having increasing importance. The EuroTransMed Foundation (ETM), a non-profit organisation, has provided high quality evidence based CME delivered by satellite to over 200 sites for eight years. Interactivity has been incorporated as a key educational tool, directly with the panel, via local moderators or in a self-directed manner using recordings of the live broadcasts. With an EU 4th Framework Telematics Grant, ETM has developed its web presence (www.etm.nl), initially with real audio and graphics and subsequently with software for real video using server replication and hospital LANs. In February 2000, on-line CME assessment modules were introduced, with the ability to gain credit equivalence for participation.

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007 **TELEHEALTH STANDARDS - NOT JUST ABOUT TECHNOLOGY!!**

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As telehealth programs move toward a more "operational basis", where telehealth becomes an accepted component of healthcare delivery, the lack of standards will become a major detriment in developing effective and efficient programs. This is a critical area that must be addressed for telehealth to be successful.

Much of the current focus in standards development has been on technology standards - those relating to technologies, telecommunications, networking and videoconferencing. These are viewed as the "easiest" components of the telehealth standard environment to resolve, but efforts to establish a common agreement on technology standards have been largely uncoordinated, and often do not include those who can provide significant expertise to the process ... in particular the vendor community.

To have effective and practical telehealth standards it is necessary to understand and integrate the requirements of the clinical providers with the technology-based standards. This has been accomplished by modeling telehealth workflow and processes and by identifying areas where standards are needed. Standards identified during the modeling and analysis of a variety of telehealth services include: those for telecommunications (to support interconnectivity); for technologies (to support interoperability); for data (to support security and confidentiality); and for clinical practice (to support interaction and communications between providers). This process for developing standards ensures that all aspects relative to the successful implementation of telehealth are considered in the standards process.

008 **MAKING TELEHEALTH SYSTEMS WORK TOGETHER: UNDERSTANDING INTEROPERABILITY**

Dale Bergman, Ralph Ulmer, Peter Sargious, Alberta Research Council, Calgary, Alberta, Canada

There are many definitions of telehealth but each refers to the use of telecommunications technology to deliver some form of health information at a distance. The scope of this definition is very broad and has made it difficult to develop standards specifically for telehealth that help to ensure telehealth equipment can properly deliver the clinical specialty or specialties to which they were designed.

Almost all telehealth systems are composed of a variety of different computers, medical devices, network equipment and software applications. The integration of these different technologies dramatically increases the complexity and issues surrounding interoperability. Interoperability refers to the ability for telehealth equipment to communicate and exchange information to achieve predictable results. To further compound the problem, all of these technologies as well as the telehealth needs and practices are rapidly changing. These issues have hampered the development efforts in creating standards specific to telehealth.

In order to address the need for telehealth interoperability, the Alberta Research Council (ARC) has developed a Telehealth Interoperability Process. The ARC is working with provincial, national, and international, telehealth stakeholders to utilize this process in creating telehealth system and interoperability standards for telehealth systems. In addition, the RAC has established a facility for testing telehealth equipment for compliance with these telehealth system and interoperability standards. The development and validation of these standards will lead to better integration of telehealth applications, more flexibility in equipment selection, reduced cost of telehealth systems, and less technological obsolescence.

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009 **TELEHEALTH INTEROPERABILITY LAB: AN APPROACH TO INTEROPERABLE TELEHEALTH SYSTEMS DEVELOPMENT**

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The contribution of standards to improve functionality of telehealth systems is highly recognized. However, conformance to standards alone does not guarantee interoperability, which is critical to ensure telehealth systems to allow information exchange throughout care delivery systems and meet expectations of healthcare professionals. To address interoperability issues properly, the Alberta Research Council has established the Telehealth Interoperability Lab. Its primary goal is the development of standards for interoperable telehealth systems, and the establishment of certification processes and tests for interoperability and conformance to standards.

This presentation discusses the services provided by the Interoperability Lab, some of its accomplishments, challenges, and opportunities. We show how the work performed at the Lab has contributed to the development of interoperable telehealth systems in Alberta. We discuss the difficulties encountered in the last two years, and the opportunities to contribute to the development of the telehealth industry.

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010 **DEVELOPING A GENERIC INFRASTRUCTURE FOR TELEHEALTH SERVICES IN RURAL AND REMOTE AREAS**

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Enabling technologies can assist rural/remote communities due to: lack of health information; poor integration of health services and community economic development; and the paucity of services, infrastructure, and trained care providers.

Objective: A working community-based, rural/remote, sustainable, interoperable technological infrastructure will be described, along with its services/applications.

Methodology: Using a community-development model, a literature search of available technologies, and relevant experiences, a technological architecture was developed.

Aspects of this framework will be discussed: Principles/Criteria; Components (products/network mechanisms/content); Schematic diagram; Services/applications; Evaluation approaches, National and international in scope, this community-driven, technological framework is a model for connecting remote areas to optimize health/health services.

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011 REQUIREMENTS FOR THE INTEGRATION OF MEDICAL IMAGES IN VIDEOCONFERENCING SESSIONS

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Introduction
The crucial role of medical imaging calls for its seamless integration in videoconferencing-based telemedicine. However, the increasing availability of digital images along with the success of the DICOM standard now allows for the existence of radiology departments with entirely digital output and signals the need to revisit such integration in this changing environment.

Objectives
The purpose of this study is to characterize the requirements for the integration in videoconference-based telemedicine of medical images in a manner compatible with requirements of efficacy, quality and confidentiality. Some performance criteria to accomplish this will be defined, and techniques to satisfy them will be described.

Methodology
Results gathered in an active telemedicine center during the course of multiple videoconferencing sessions are analyzed against the performance criteria. That center is in a transitional period on the road to filmless medical imaging, which allowed to evaluate the avenues that such a migration will make possible.

Conclusions
No solution was found to meet all performance criteria. However, the T120 based "whiteboard" sharing of image data was found to be the most viable option at the moment, but in all likelihood will soon be displaced from that position by new methods which will be better suited for an all-digital form of medical imaging.

012 INTEGRATING INTERNET, REMOTE db AND HEALTH CARDS: THE G8 CARDIO-ANMCO PROJECT FOR CCU's

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G8Cardio-ANMCO project - ITALY in the framework of the G8Cardio Global Cardiovascular Database Project a joint initiative with the ANMCO (Italian Nat.1 Ass.n Hosp. Cardiologists) was started to deploy a national patient-care database and communication platform in 130 Coronary Care Units (CCUs). A nationally standardized set of core data elements of cardiological clinical, instrumental, procedural and treatment variables was developed and a SQL clinical system was provided to the CCUs connected via IP across the country. A national SQL database merges all local databases. Patients' and professionals' smart cards were also developed and embedded in the application. Each physician and each patient in the participating CCUs are provided with the cards; their combination provide a secure access to db. As a result, for the first time worldwide, patients can be treated at multiple sites in a shared care infrastructure maintaining a national hospital cardiac record accessed through Internet.

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013 A SUCCESSFUL STORE AND FORWARD TELEMEDICINE MODEL IN NORTHERN CANADA

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Purpose: To investigate the use of a PC-based store and forward telemedicine system for remote consultations and to conduct a cost analysis. Method: A nurse located in a remote island community used a telehealth system to capture still images and video clips from patients. These were incorporated into an electronic folder and sent to physicians at the regional hospital for review. Patients and health professionals were given questionnaires to complete after each session.

Technology: 120 MHz 32 RAM Pentium computer running VisiTran MD software, an Andries Tech General Exam Camera, and an AMD otoscope. Telecommunications were via analog microwave equivalent to a single telephone line, e.g. 56kbps.

Results: Physicians stated the telehealth system allowed them to make more informed decisions regarding patient and the need for transfer. The nurse felt he provided a higher quality of care and was more confident. Of the 32/40 patients who completed the questionnaire 84.4% indicated that they felt their care was much better and 51% felt they had quicker access to the physician. Eleven fewer emergency air transfers and 23 fewer scheduled air transfers occurred after telehealth was introduced, compared to the previous year (significant decrease $p < 0.05$). The cost of the system (hardware, software and telecommunications for one year) was $52,470. Savings from the reduced number of transfers was $57,255.

Conclusion: This study demonstrates that a store and forward telemedicine system can be used for remote clinical consultations and users are satisfied with it. The reduction in patient transfers in one year result in savings that are enough to cover the cost of the system.

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014 THE IKAJURUTI INUNGNIK UNGASIKTUMI (IIU) NETWORK

Tina McKinnon, Department of Health and Social Services, Iqaluit, Nunavut, Canada

THE IIU NETWORK Ikajuruti Inungnik Ungasiktumi in Inuktitut means "a tool to help people that are far away". The Department of Health and Social Services developed the IIU Network as a new way to deliver services not available in Nunavut communities.
Nunavut covers approximately 24% of Canada's landmass, whose population is 26,000 people, 85% consisting of Inuit. We have 26 communities whose average is 660.
Some of the challenges we face are, as compared to the national average, 6 times the suicide and 8 times the TB rate. The IIU Network upholds the mission and goals of the Department of Health and Social Services.
We see the IIU Network as a community tool to provide health, social services. education and justice to improve the quality of life of all our residents.
Pond Inlet and Cape Dorset, located in the Baffin Region, function as referral sites to Iqaluit the capital and consulting site in Nunavut. We conduct regular counseling sessions, speciality and follow-up clinics as well as education sessions for our clinicians. As a territory we have made national and international connections.
We plan to expand the IIU Network in the Baffin as well as the Kitikmeot and Keewatin Regions. We have developed a phased implementation plan, which includes input from the communities as well as, other partners.
The Government of Nunavut is investigating all technology avenues to improve access for our residents; Telehealth increases accessability for much of our needed services.

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015 DEMONSTRATION OF THE USEFULNESS OF TELEHEALTH IN PROVIDING ENHANCED PRIMARY HEALTH SERVICES TO THREE GEOGRAPHICALLY REMOTE COMMUNITIES IN NORTHERN ALBERTA

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The Keeweetinok Lakes Regional Health Authority (KLRHA) is located approximately 300 kilometres Northwest of Edmonton Alberta. Six rural communities are linked via the KLRHA's satellite based telehealth system. Three of the smallest and most remote northern communities have a history of limited primary health services.

Health centres staffed by a nurse in an expanded practice, and equipped with satellite based telehealth equipment, were recently placed in each community. Telehealth was used to enhance primary health services such as: Speech Language Pathology, Health Promotion, Occupational Therapy, Gerontology, Services for Children with Challenging Needs, and Nutrition. Telehealth was also used to deliver inservices and continuing education sessions to staff.

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016 TELEDERMATOLOGY OUTCOMES IN THE CORRECTIONAL SETTING: A CASE-CONTROL STUDY

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CONTEXT. Teledermatology has become increasingly deployed in correctional settings in the United States. There is little data available comparing the clinical outcomes using teledermatology to traditional outpatient management in such settings.
METHODOLOGY. We compared 25 consecutive teledermatology cases with 25 consecutive cases from our outpatient dermatology clinic in terms of treatment recommendations and clinical outcomes. Outcomes identified were i. stable ii. improved iii. worsening condition iv. referral for biopsy. Teledermatology clinics were performed using interactive videoconferencing at 384KB via ISDN lines and AMD general examination cameras and dermascope devices.
FINDINGS AND CONCLUSIONS. Average length of follow-up, outcomes and treatment recommendations were similar in both groups. 8% of outpatients experienced worsening of conditions compared to 0% of teledermatology cases. 12% in both groups had documented improvements. 8% in both groups were referred for biopsies. Our preliminary experience with teledermatology in the correctional setting suggests similar outcomes to traditional outpatient management.

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017 EXPANSION AND IMPLEMENTATION OF SCHOOL-BASED TELEMEDICINE THROUGHOUT KANSAS

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TeleKidcare® was launched in the spring of 1998 linking physicians from the University of Kansas Medical Center (KUMC) and school nurses from the Kansas City, Kansas school system (USD500) for clinical consultations using telemedicine technology. The project initially connected pediatricians and child psychiatrists utilizing PC-based telemedicine technology with 4 elementary schools, and has since grown to 11 schools.

Thanks to $250,000 funding from Governor Graves of Kansas, TeleKidcare® is being expanded to three additional rural and urban communities. With matching funds, the expansion will involve 15 additional telehealth and telemedicine suites. The primary focus will continue to be on primary care, behavioral pediatrics and special needs care of children.

This presentation will focus on the successes of TeleKidcare® in urban Kansas City and the Key programmatic strategies and policy issues in expanding and implementing school-based telemedicine throughout Kansas.

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018 TELEMEDICINE BASED PEDIATRIC INTENSIVE CARE UNIT (PICU) CONSULTATIONS TO UNDERSERVED RURAL NORTHERN CALIFORNIA

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Rural northern California is underserved for PICU's, with 600 miles between the closest. Mercy Redding Hospital (MRH) serves rural northern California and has attempted to provide care to critically ill children, all models have failed despite an annual volume of 200. Therefore, telemedicine linked the UCDavis PICU with the Adult ICU at MRH.

Goals are to transfer the sickest to the UCDavis PICU, the less critically ill remain at MRH. So far, 8 children have been considered for telemedicine, 2 remained at MRH, a 13 y.o. with DKA and a 6 y.o. with trauma; both recovered. 6 eligible children were not enrolled, 5 due to ER MD and 1 due to parental objection.

This represents a new model of delivery of PICU care to a rural area, one of the first such uses of telemedicine. Current challenges include referring physician acceptance.

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019 **TELECARDIOLOGY IN THE MANAGEMENT OF PATIENTS WITH SUSPECTED CARDIAC EVENTS**

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Aim: To test the usefulness of telecardiology in supporting the decision-making process of 1200 general practitioners (GPs), equipped with transtelephonic electrocardiogram (ECG), in the evaluation of patients (pts) with suspected cardiac events.
Methods: A total of 39,116 pts (17,562 males, mean age 59.8 years) were evaluated.
Results: Of 39,116 pts, 24,253 (62%) had no cardiac events, 13,407 (34%) presented a non-life-threatening cardiac event, and 1,515 (4%) showed ECG and clinical signs of acute coronary artery disease (77%) or life-threatening arrhythmia (23%). In the 14,922 pts with cardiac events, the diagnosis was obtained within one hour from the onset of symptoms in 42.2%, 3 hours in 27.6%, and more than 3 hours in 30.2%.
Conclusion: Telecardiology is a simple, reliable and efficacious tool in routine primary care. It offers instant access to cardiac assessment and supports the decision-making process of GPs.

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020 **POTENTIAL FOR THE TELEMEDICINE IN ROUTINE PEDIATRIC PRACTICE**

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Objective. To estimate the potential for a neighborhood-based, nurse-assisted telemedicine model to reduce in-person visits for acute illness seen in routine pediatric practice. By reducing geographic and transportation barriers to care in both urban and rural settings, telemedicine might reduce the large morbidity and economic burden attributable to this illness. Methods. For a recent 12 mo period, visits for acute illness in children (<18 yr) presenting to the primary care center (PCC) and the emergency department (ED) of this medical center were studied. Based on 28 yr of clinical experience and a brief trial of telemedicine, a medical-center based general pediatrician classified visits to the PCC and ED using diagnoses to assess the potential for evaluation and treatment with telemedicine alone. Diagnoses were classified in 11 groups based on key presenting symptoms. Thus, telemedicine peripherals needed for diagnosis were similar within groups. Groups included skin, red eye, dehydration, infant fever, child fever, infant respiratory, child respiratory, minor trauma, other likely, and other unlikely. For this last group, we estimated that less than 25% of episodes could be managed with this telemedicine model; whereas, for the remaining 10 groups (termed *telemedicine likely*), we estimated that more than 50% of episodes could be managed with telemedicine alone. Results. Among the 12,215 visits presenting to the PCC, the most common groups were respiratory (33.8%), skin (12.3%), other likely (10.9%), and fever (10.7%). Altogether, 77.9% of PCC visits fell in the telemedicine likely group. Among the 19,679 visits presenting to the ED, the most common groups were other likely (22.5%), minor trauma (17.1%) fever (12.3%), and respiratory (10.5%). Altogether, 68.5% of ED visits fell in the telemedicine likely group. Assuming at least 50% of telemedicine likely visits could be managed with telemedicine alone, observations suggests that at least 39% of primary care office visits and 35% of emergency department visits could be replaced with telemedicine. Conclusions. These findings are useful in configuring telemedicine equipment and in designing studies for evaluation of telemedicine reliability and efficacy. Further, they suggest that telemedicine has tremendous potential for integration in routine pediatric practice.

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021 **TELEMATICS IN RISK FACTOR INTERVENTIONS**

Reinhild Zolg, Günter Topf, Klaus Langguth, Gerald Holnburger, Egbert Nüessel, Private Practitioners' Research Institute, Heidelberg, Software House CoKom, Wertheim, Germany

To optimise primary medical health care three IT-systems are presented:

1. To give the physician the possiblity of assessing his skills in risk factor intervention objectively by statistics we present a system whose development is based on practical experiences made by 14 general practitioners, 2 internists and 3 gynaecologists in the intervention with regard to smoking, overweight, hypertension and hypercholesterinaemia.

2. To support verbal explanations of diagnostic and therapeutic measures in the physician-patient dialogue a library for two-dimensional animation has been set up. Pictures can be displayed by pressing just a button. So, the dialogue is not disturbed.

3. To improve particularly the compliance, changes in risk parameters found in the individual patient are demonstrated to him in form of curve diagrams, again in the physician-patient dialogue.

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022 **MANAGED CARE AND TELESURVEILLANCE A POSSIBLE MATCH?**

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Case management and telesurveillance provides new methods for proactively managing and delivering quality health care services to clients at high-risk or presenting persistent health problems. Based on interdisciplinary and interinstitutional collaboration, on one hand, case management meets the goals of achieving optimum results both clinically and administratively, on the other hand, telesurveillance provides a way to stay in contact with a person at risk and their primary caregiver. By considering the interinfluence between the individual and the family caregiver (parent, spouse, neighbour...), this approach aims at enhancing the clients' and caregivers' potential for self care of health care problems, which represents a major innovation in Quebec and in Canada. Publications on the subject of case management implemented in the United States in the late 1980s report findings which focus almost exclusively on the individual alone. The restructuring of health care services and methods of financing by DRGs (diagnosis related groups) created the catalyst to put in motion new health care practices and case management as an approach for reorganizing the clinical process thus favouring effectiveness and quality outcome. Actually, in the United States, many reasons have favoured the implementation of this approach, such as: 1- the lack of service coordination which, according to certain authors, leads to an increase in cost due to the inappropriate use of services; 2- an increase in length of hospital stay due to the deterioration of the individual's health status; 3- an increase in the rate of complications related to premature hospital discharge without planning or follow-up care with the patient and family, specially the main caregiver. In Quebec, nurses were the pioneers in the development and implementation of patient case management and more recently in collaboration with occupational therapist the implementation of telesurveillance. This presentation will present difficulties encountered in implementing managed care and telesurveillance in a research context.

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023 HOME TELEMONITORING IN HYPERTENSIVE PREGNANT WOMEN

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Objectives: To study the feasibility of home monitoring of blood pressure during pregnancy. To conclude on main practical aspects about home telemonitoring.

Methods: 55 mildly hypertensive women were asked to measure their blood pressure six times a day and to check urines daily at home with a validated automatic oscillometric device. Data were automatically transmitted by the device to a central office (TAM-Telesante). The home assessment was validated if more than 22 measurements were transmitted.

Results: 90% of assessments were correctly transmitted. The prevalence of white coat hypertension was 77%. 23% had real hypertension.

Conclusion: During pregnancy, telemonitoring of blood pressure at home is an efficient, safe, and economical alternative to repeated office visits or hospitalization to screen for hypertension. This technique avoids false diagnosis of hypertension and unnecessary hospitalizatioin (cost/efficiency). The device and the method must be fast and easy to install and operate. Telemonitoring provides a cost/efficient and robust method for screening for hypertension.

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024 CHRONIC WOUND MANAGEMENT IN COMMUNITY AND ACUTE CARE

Margie Tymchuk, Nova Scotia TeleHealth Network (NSTHN), Dartmouth, Nova Scotia, Canada

The burden of illness related to chronic wounds in society is well established and an enormous amount of health care dollars are expended on treatment each year. There is clear evidence regarding the cost effectiveness and efficacy of certain chronic wound treatments versus other conventional methods, yet much of the knowledge has not yet been incorporated into practice.

Cost effectiveness in wound care stems from accurate and timely diagnosis, appropriate treatment, and ongoing monitoring of the wound. Frequent follow-up visits with specialized care providers are paramount to effective cost efficient wound management. Where written and photographic documentation of wound progress can occur, treatment adjusted according to evidence based protocols.

The Nova Scotia TeleHealth Network (NSTHN) offers innovative solutions to these issues by bringing specialized chronic wound management to patients and care providers in their local communities. This presentation describes a program currently being implemented in the NSTHN, which provides care giver and client access to the specialist expertise of the Advanced Practice Enterostomal Therapy Nurse for the management of chronic wounds in the community and acute care.

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025 CANADIAN PERSPECTIVE ON MEDICO-LEGAL ISSUES IN TELEHEALTH

Wayne Bell, The Digital Group of Telehealth Companies, Dartmouth, Nova Scotia, Canada

With the advent of information technology, telehealth professionals find themselves faced with several key questions:
- How should these technologies be applied, so as to ensure patient confidentiality, compliance to changing legislation and case law?
- What policies will ensure best practice and provide a reasonable and prudent approach, that will likely afford the healthcare provider with the maximum degree of legal protection?
- How do we harness the benefits that these technologies promise, with a minimum degree of frustration and the maximum degree of workability?
To answer these and other questions, we must appreciate the new "standard of care" being developed through the legislative/legal process. Regional. national and international legislation is being introduced that will affect the interoperability of telehealth.
The author will outline trends as they pertain to the Canadian perspective and discuss draft policy, under review by the International Bar Association. Specifics of legislation will not be covered in-light of time allotted. The author will however suggest some "next steps", which may enhance stakeholder position and increase the development of workable policies and guidelines.

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026 THE EHTEL GREEN PAPER ON THE LEGAL ETHICAL AND SECURITY ASPECTS OF EUROPEAN HEALTH TELEMATICS

Benedict Stanberry, Centre for Law Ethics and Risk in Telemedicine, Cardiff, Wales, UK

Thematic Working 6 ("T6") of the European Health Telematics Association ("EHTEL") aims to catalyse action to minmise or remove the legal, ethical and security issues that present barriers and impediments to the evolution and use of telematics in Europe. This year T6 will prepare a Green Paper for publication at the EHTEL Conference in Lille, France on 16-17 November 2000. A Green Paper is a document that announces entative proposals for discussion on a given issue and invites comments and opinions so that the issuer is able, without loss of face, to leave its final decision open until it has been able to consider public reaction to it.

The objectives of the EHTEL T6 Green Paper will be: to identify what actual legal, ethical and security issues affecting the evolution and use of health telematics in Europe are; to assess how and to what extent each of these issues presents (or will present in he future) a real barrier or impediment to health telematics; to suggest workable ways of reducing or removing these barriers and identify the various institutions and bodies that must co-operate in this process; and to promote reflection and debate and to invite all those with an interest in health telematics to submit their written comments and observations on the findings and proposals contained in the Green Paper.

The T6 Green Paper is intended to help crystallise the actions needed on both a national and international level to enable health telematics to grow and thrive within Europe, and will be the basis for specific action plans that will be undertaken by EHTEL and other organisations over the coming three years.

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027 **LEGAL ASPECTS OF TELEMEDICINE - EXPERIENCES GAINED**

Leif Erik Nohr, National Centre of Telemedicine, University Hospital Tromso, Norway

Over the last years the Norwegian Health Ministry has financed a project on "Legal Aspects of Telemedicine in Practice" at the National Centre of Telemedicine. The project has been aimed at identifying and clarifying the possible legal problems or challenges raised by implementation of telemedical solutions and services in the health care system.

Over these two years the project has focused on several legal issues where use of telemedicine might challenge existing legislation and on the limitations that this legislation represents. Thanks to our National Centre's close connection to users on different levels of our health care system, we have had the opportunity to learn what issues the medical professions consider most important and crucial to further and full implementation of telemedical services.

In this presentation we will share some of the experiences we have gained so far. We will present some of the issues pointed out as representing the most important legal challenges for telemedicine in Norway. Some of the main issues are concerning confidentiality, responsibility and licensing. In some of these issues Norwegian health authorities have either given specific regulation or have interpreted existing regulation in a telemedicine context, and the regulations and/or interpretations will be presented.

Looking ahead, there are two issues that we believe will represent new and strong challenges for the health care sector and for the legislation regulating it: Globalization and patient empowerment. The presentation will share some views on these issues as well.

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028 **TACKLING BARRIERS TO HEALTH TELEMATICS: CROSSING THE CHASM AND ENTERING THE TORNADO**

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The march of health telematics applications from the laboratory bench into the mainstream healthcare practice is now thought to be unstoppable, but the expected barriers and challenges to this march that have for so long been debated and discussed - yet never tackled - now present formidable obstacles to the progress of e-health and telemedicine revolution.

Wilnfried Holz, President and CEO of Siemens Health Technolgies, has identified three key obstacles that he believes must be successfully tackled for e-health and telemedicine businesses to continue their onward march. His so-called "Bermuda Triangle" consists of Technology, Economics and Legislation - three key requirements that must be met for industry to cross the formidable chasm that lies between simple research, development and evaluation of health technologies and entry into the tornado that is hoped the new paradigm of patient-centred healthcare delivered with these technologies will create.

This presentation examines these three obstacles in the context of Moore's theory of the "chasm", the "bowling alley" and the "tornado" as the key stages in the evolution of a high tech market place. It examines the findings of the market research report "The Emerging European Health Telematics Industry" recently published by Deloitte & Touche and compares the fortunes of some e-health and telemedicine companies that have either thrived or failed. The presentation identifies some strategies for success in an emerging yet still immature health telematics market place and highlights areas whre greater proactivity and co-operation is still required between government, industry and users.

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029 LEGAL ISSUES IN INTERNATIONAL TELEHEALTH CONSULTATION

Barry B. Cepelewicz, Stephen J. Schanz. Legamed Inc., Raleigh, North Carolina, USA

With the continued deployment of telemedicine and telehealth, the volume of international teleconsultations will likely increase. Though the technology which enables such teleconsults appears to be quickly evolving, laws, rules, regulations and judicial opinions relating to these matters are only slowly emerging. Practitioners and administrators involved with international consultations need to be mindful of the many legal issues associated with these activities and, to the extent feasible, address them in contractual documents. By way of example, an international teleconsult between practitioners, or a practitioner and patient, in different countries could raise the following issues:

- Standard of care: Which countries' "standard" applies?
- Malpractice insurance: Will a providers' malpractice policy cover activity in another country?
- Medical records: Which countries' law applies and who bears responsibility for retention?
- Licensure: Is it necessary for the consulting provider to be licensed to practice medicine in the remote country?
- Differences in language & custom: Have appropriate arrangements been made to bridge applicable language barriers and relevant customs?
- International treaties: Are there are any international treaties or agreements which are applicable to some, or all, of the elements of the teleconsult?
- Technology breakdowns: Who bears responsibility for technology errors or failures?

The presentation will address these items, in addition to discussing how practitioners may plan in advance for international teleconsults via discussions with insurance carriers, consultation with legal counsel, and preparation of relevant contracts.

030 MEDICO-LEGAL AND ETHICAL ASPECTS OF E-MAIL; COMMUNICATION BETWEEN PATIENT AND HEALTHCARE PROVIDER

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E-mail communication between patients and their healthcare providers already takes place and its frequency can be expected to increase significantly over the next decade, not just as a manifestation of the growing ubiquity of e-health in all its manifestations, but also as people gain easier access to the Internet and become more aware of and more comfortable with its potential for everyday communication. Like the telephone, e-mail can be a useful way of instantaneously delivering information to a remote patient, but it can also place severe limitations upon the quality and availability of clinical information and may allow unqualified individuals to impersonate qualified mdical practitioners.

This paper examines several legal and ethical consequences of the use of e-mail as a medium for communication between patients and healthcare providers, including the status of e-mail messages as medical records; concerns over privacy and confidentiality; issues of informed consent; the dangers of fraud; abuse and malpractice; whether medical services delivered by e-mail can be or should be reimbursed licensing and jurisdictional problems and the need for the development of standards and codes of practice. The paper also includes a review of emerging legislation and goverment initiatives in this field, in both Europe and North America.

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031 HEALTH TECHNOLOGY ASSESSMENT ON VIDEOCONFERENCING FOR TELEHEALTH

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This study, initiated by the CCOHTA, is a collaborative assessment of telehealth in Canada with the participation of provincial health technology assessment agencies, the Office of Health and Information Highway at Health Canada, representatives from provincial and territorial ministries of health, and telehealth programs.

The general study objective is to assess the impact of the use of videocconferencing (VC) for provision of health care at a distance and continuing health and medical education in Canada.

The study design includes an in-depth survey of eight telehealth VC programs across Canada. The survey questions include those related to (i) timing and the scope of VC applications, (ii) technical description, utilization, costs, effectiveness, and user assessment, and (iii) planning, training and education, policy, implementation, organizational and human resource issues, access, and patient confidentiality and privacy.

The survey responses will be synthesized into a report format, which will include a contemporary literature review. The study findings will be presented at the annual meeting.

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032 IMPACT EVALUATION METHODOLOGY OF TELEMEDICINE SERVICES FOR INTERMEDIARY CARE

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A goal of telemedicine projects should be the implementation of methodologies for the costs and benefits analysis (CBA) carried out on the involved population: physicians, specialists and patients.

The CBA has to investigate all the aspects and possible effects caused by the introduction of new services, in order to point out the project offering more elevated benefits. In this methodology, a dedicated software acquires and analyses, at predefined frequent milestones, all the information needed to analyse impact evaluation of the project from different points of view:

- patients' quality of life;
- care cost saving;
- improper admissions to hospitals or E&R Dept.
- treatment modification;
- costs and time of physicians' movements;
- patients' wasting of time;
- psychological discomfort.

This method aims at estimating the increase of health state through the value that patients, their family, physicians and service organisation attribute to these data apart from economic consequences that derive to them. This methodology has focused on the project impact, measured through evaluation of costs and social benefits, and on the assessment of all the possible effects, included intangible benefits on population comfort and direct/indirect effects on Public Health Service budget.

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033 DICIT EXPERIENCE: INTERMEDIARY CARE SERVICE FOR STABILIZED HEALTH PATIENTS

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DiCIT (Department of Telematics Intermediary Care in domiciliary hospitalisation) intends, using telemedicine, to rationalise the allocation of resources destined to primary care and to answer essential requisites of Health Services: effective continuous care spreading on district area; assistance humanisation; increasing care appropriateness; saving in the Service disbursement.
The scenario is related to the management of stabilised heart patients during domiciliary period, and to their monitoring. Main objectives of the on-going project involve different points of view:

- — social, useless hospitalisation and its uneasiness;
- — economic, meaningful resource saving;
- — organisation, closed collaboration between GPs and specialists;
- — information, to maximise patients' data transfer;
- — health, reduction of improper admissions to E&R Dept;
- — management, to give back to GPs their main role in management of patient care.

In the implemented solution, GP send patients' ECG acquired with handle electrocardiographs to Diagnostic Centre via PSTN or GSM. Cardiologists make a diagnosis, consult GP on-line, agree on treatment, e-mail report to GP's practice and archive ECG, report and clinical data. These information are shared with patients' Reference Hospitals.

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034 USE OF ADVANCED TELECOM SERVICES AND APPLICATIONS BY THE EUROPEAN HEALTH SECTOR

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To assess the need of expanding the Universal Service Obligation definition to the European Union health sector, data on communications between three major players - hospitals, GPs and citizens - and on health telematics applications were collected.

Based on an analytical concept of their relationships and an empirical survey of European health system structures, information on access equipment, access to advanced networks (ISDN, leased lines) and advanced services (internet, health services) for 15 countries is reported. Experimental usage for 5 generic telemedicine application types based on surveys and country reports was determined. An analysis of 4 major facilitating and constraining factors - technology, health system structures, medicolegal and efficiency/reimbursement aspects - synthesises this experience and allows to derive a realistic picture of presently very limited routine as well as experimental use of telemedicine in most European countries.

Telecom and health policy implications are outlined.

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035 TECHNOLOGY ASSESSMENT OF TELEULTRASOUND IN A NORTHERN COMMUNITY

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Context: Keeweetinok Lakes Regional Health Authority #15, located 300 km Northwest of Edmonton, is geographically large, culturally diverse (45% aboriginal) and sparsely populated. Teleultrasound could improve access to diagnostic services for persons in our remote communities. In the past, clients from Wabasca/Desmarais drove to Slave Lake for ultrasound and 1/3 did not keep their appointments.
Objective: To evaluate the benefits and costs of Teleultrasound in Wabasca/Desmarais.
Methodology: Satisfaction and costing data were collected with Administrative Databases and Client Satisfaction questionnaires. Societal costs were calculated for two models of providing ultrasound examinations. The first model used Teleultrasound and the second Patient and Specialist Travel to a centre with ultrasound equipment.
Main Findings: In six months, 25 ultrasound examinations were booked and 22 were completed (12% unable to keep appointment). Key client satisfaction findings are (n=19, 86% return rate): Telehealth improves access to health care - 100%; prefer Telehealth over travelling - 89%; care received via Telehealth was as good as a regular visit - 88%; would use the system again and would recommend Telehealth to others - 100%. Overall satisfaction was 95%. Economic analysis indicated that at 475 examinations per year the total service costs of Teleultrasound (fixed and variable) would be the same as those for clients and specialists travelling (C$313 per consultation).
Conclusions: Beneficial consequences of Teleultrasound are high client satisfaction and a decrease in unkept appointments. Teleultrasound has greater fixed costs than travelling for service. An increase in the number of Teleultrasound examinations needs to occur for fixed cost savings.

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036 IMAGE COMPRESSION FOR COST-EFFECTIVE TELERADIOLOGY

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Wide application of teleradiology is still limited by technical factors. Image compression at medically acceptable levels could thus stimulate acceptance. 181 radiological images from several different modalities were compressed at 10-12 steps up to 150-fold. 4 series totalling 2458 images were randomly listed and presented to clinicians for determination of acceptable image quality for diagnostic analysis, using JPEG and Wavelet algorithms.

Evaluation comprised the average compression ratio unrecognised by the experts ("visually lossless compression") at the 98 % confidentiality level, and the intra- and inter-observer variability. While JPEG compression remained unrecognised by the medical experts until 12- to 19-fold, Wavelet-algorithms allowed up to 85-fold compression, although allowable ratios differed between imaging modalities with both compression methods.

Results indicate that visually lossless image compression may substantially reduce costs of teleradiology. Tools for sender-controlled Wavelet image compression could thus improve acceptance.

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037 IMPACT OF TELEMEDICINE ON PEDIATRIC CARDIOLOGY PRACTICE 1987 - 2000

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Since 1987 telemedicine has transformed patient care and education in our regional tertiary pediatric cardiology service.

1. High resolution broad band transmission of echocardiograms live from remote sites has allowed 24 hour access to pediatric cardiology expertise by 7 regional hospitals. During 13 years over 650 studies have been transmitted with excellent quality. Avoidance of travel costs more than offset the operating costs of the network.

2. Since 1999 teleconsultations (384 kb) have been performed for 26 selected patients with arrhythmias or syncope and pre-op counselling sessions. Both families and health personnel adjusted quickly to the teleconference and expressed satisfaction. Families appreciated avoiding the cost and time of travel for in-person visits.

3. Cardiosurgical teleconferences with a referring cardiologist have used 384 kb bandwidth to transmit echo or angiographic images with a suitable resolution for conference purposes.

4. Monthly resident teaching teleconferences have linked 6 training programs across Canada. Scarce expertise has been shared in specialized areas such as cardiac pathology, arrhythmias and MRI.

Thus, telemedicine has greatly expanded both access to care and teaching for pediatric cardiology in our regional centre.

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038 TELEMEDICINE AND DIABETIC RETINOPATHY ASSESSMENT

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Blindness from diabetes remains the first cause of blindness in the active population in developed countries although it can be prevented in 98% by regular screening and timely treatment. The validity of telemedicine systems designed for the purpose of mass screening for diabetic retinopathy (DR) have not been fully evaluated. Moreover the necessity for pupillary dilatation (mydriasis) to image the retina necessitates medical surveillance and is an obstacle to mass screening. We measured the performance and adequacy of a non mydriatic retinal digital camera for the purpose of mass screening for DR.

This prospective study on 57 patients (104 eyes) compared the grading of DR and the treatment plan derived from the review of its pictures with the accepted standards, observation by an experienced specialist and 7-field 35 mm photographs. In spite of the limited resolution actually provided by such systems, we found a high level of both sensitivity and of specificity for detection of DR and showed that valid diabetic population screening is feasible using our methodology.

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039 EMAIL-BASED TELERADIOLOGY USING DIGITAL CAMERAS

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Background: Although many rural hospitals in developing nations have basic X-ray equipment few have radiologists on staff to interpret the images. A cheap, simple-to-use form of teleradiology based on emailing digital images to specialists may help solve this problem. There is a need to evaluate the reliability of such a method.

Methods: We used a 1533 X 1024 pixel Kodak DC265 digital camera to photograph 24 x-rays constituting 21 clinical teaching cases. X-rays were photographed on a standard light-box. All x-rays were chest films; all cases had a PA x-ray; some had lateral x-rays. Images were cropped and compressed (JPG files, average 130kb). The images and histories were emailed to three radiologists.

Results: A total of 74 x-rays were reviewed. 94.5% were interpreted correctly. All three radiologists misread one x-ray, that of a small (3mm) benign nodule. One radiologist also missed a subtle bilateral infiltrate. Of note, a normal chest x-ray, subtle apical infiltrates of TB, lung contusions from trauma, and a 5% pneumothorax were all read correctly by all 3 radiologists.

Comment: A simple, cheap teleradiology system using inexpensive digital cameras and email may be a reliable way of providing radiological support for isolated rural hospitals in developing countries. Common abnormalities seen in such facilities, such as TB and lung injury related to trauma, such as pneumothoraces and contusion, can be diagnosed using this system. Further work is being carried out in Africa to test this approach.

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040 REGIONAL INTERNET-BASED PRENATAL SONOGRAPHY

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Prenatal sonography is a new and evolving area. Not much is known about sonographic features of many malformations. Therefore, a large prospective study and collaboration of researchers in leading institutes are needed.

Objectives:

1. To define efficient ways to transfer sonographic data via the Web using Internet-2.

2. To develop an Internet-based academic teaching program in sonographic examination.

3. To create a basis for an on-line consultation during sonography.

Methodology:

A teaching program in sonography is developed in English, Hebrew and Arabic. New Internet-2 based tools are developed to enable real-time consultations. Potential social and economic contribution: The availability of Internet-based educational materials in Hebrew, Arabic and English will enable teaching of medical residents. The program will enable training of physicians in the neighboring countries and regional cooperation.

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041 HC FORUM (*) / A TELE-EXPERTISE IN HUMAN GENETICS

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The inherited structural abnormalities of chromosomes represent a factor of malformative risk which can vary in from 0 to about 80%. Genetic counselling is so difficult. Structural abnormalities represent also a powerful tool for research on the genome.

Since 1998, we have developed a collaborative database which includes more than 4 500 family's data, and recently a Web site, HC Forum (http://HCForum.imag.fr) which offers:

* For genetics specialists: an assistance in diagnosis and in genetic counselling with risk assessment.

* For research workers: the distribution of chromosomal breakpoints and of the genome regions observed in trisomy or in monosomy at birth and responsible for polymalformationi/mental retardation syndromes.

* Users can submit directly through Internet genetic data with pedigree, dysmorphological description according a thesaurus and chromosomal and clinical pictures of the abnormalities.

After about one year, we notice about 150 000 requests from about 700 users from about 40 different countries.

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042 TELEPSYCHIATRY: NEW TECHNOLOGY TO REDUCE MORBIDITY, MORTALITY AND COST?

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Individuals with refractory depression are prone to suicide attempts, and sometimes succeed in the goal of ending unremitting misery. The depressive spectrum diseases are costly due to lost wages, and expensive care, often involving frequent inpatient and day hospitalizations, many office visits, ECT, and pharmaceuticals. The presence of a trustworthy relationship with a competent mental health professional may help keep suicidal acting out in remission, but enduring the time span between visits and coping with lengthy vacations often can be formidable. Several questions will be addressed: what is the successful suicide rate and suicide attempt rate for patients in psychiatric treatment? When in the course of treatment do patients make serious suicidal attempts? Can one predict how the technology associated with telepsychiatry will alter and lower these figures? What innovative therapeutic interventions will telepsychiatry include? Are these techniques in the hands of a skilled professional "safe" for patients?

The author has treated suicidal patients for over thirty years and has not had a single patient death. She will discuss how her therapeutic style readily adaptable to telepsychiatry will create better outcomes for critically ill patients.

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043 EVOLUTION OF TELEHEALTH TO eHEALTH AND ONTO THE INTERNET... WHY IT MUST HAPPEN!

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Telehealth success is fundamentally compromised by its very nature - in that it is designed to provide linkages between geographically separate people and facilities who have different administrative, physical, clinical and organizational components. In its simplest form, telehealth provides a linkage between a rural environment (with few providers and technical support staff and limited IT and communications infrastructures) and an urban environment (with many, and highly specialized, providers; a significant number of technical and IT support staff; and more available and affordable IT and communications infrastructures). The technologies designed to fit into these environments usually need to be very different. For this reason, although it has promised great results, telehealth has not had a significant impact on most aspects of healthcare delivery.

As we have successfully implemented telehealth solutions, we have learned that the linkages between the two "ends" of a telehealth solution consist of a number of technical factors - such as technologies that can interface and interoperate, and telecommunications that permit connection. The more difficult issues are related to the linkages between the clinical, organizational and administrative infrastructures - like the referral process, scheduling, protocol development, clinical processes and financial considerations. These are harder to identify and not easily implemented. Successful telehealth networks have, at their core, a highly motivated and competent core of individuals who can identify and manage the relationships, facilitate the development of processes and solutions, and support the administrative requirements.

For telehealth to become more integrated into health delivery we must find a more efficient and effective way to develop and support the linkages that enable telehealth to provide the patient benefits that have been promised. We believe eHealth will provide a common infrastructure for those linkages ... in a "pay for what you use" environment. As the Internet becomes more pervasive and secure, eHealth infrastructures will be able to move onto the Internet to provide a broadly based and lower cost means of supporting those linkages. Although there are many hurdles to overcome, we need to stay focused on the future benefits that such an infrastructure can provide, and how it can directly impact on the care provided to patients ... wherever they are.

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044 TELEMEDICINE AND INTERNET

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It is quite clear that health professionals resort more and more to Internet in their daily practice. Interactive Intranet Telemedicine networks between hospitals have been operational for some time. E-health gates, however, have just been introduced in France. Using the web for continuing education schemes seems to be mandatory. But data transmission security and exchange confidentiality remain a problem. Health professionals cannot but be cautious in view of the fragility of medical secrecy which is part of medical culture in Europe in general and in France more particularly. E-commerce requires a comparable degree of caution. Many net surfers, mainly American ones, log onto health sites to solve their health problems. Most gates offer services to health professionals and patients. They collect information whose quality cannot always be under control. The percentage of consultations is very high, ranking just second after porn sites. Some of these health sites supply medical advice, even recommend treatments and may even play an additional role in the future by transmitting patients medical records to health professionals.

Internet allows for unlimited drifts such as business alliances with insurance companies or other activities which may jeopardize medical ethics. The responsibilities derived from the applications of NICTs to the health sector are quite meaningful since they involve Man both in terms of prevention and care. Interactive, well-coordinated consultations make it possible for health professionals to work in partnership and to be fully aware of their responsibilities and choices when discussing the patients files. Information highways now often replace the fax so that confidentiality and security cannot be guaranteed despite the use of electronic signatures and encryption. The globalization of the Net makes protection a very complex issue. Can domestic law be efficient in this respect? Domestic Courts encounter so many difficulties in managing the legal proceedings that we can doubt it. The havoc played by viruses and cybercrime in general show that it is quite possible to bypass data protection. Of course the web is useful for telemedicine in the field of training and information. But there is still a great need for scientific, legal and ethical studies. Systems Integration and Infomanagement are complementary. This is why I invite the scientists, the operators and the legal experts to conduct pilot studies with a view to show that using Internet in telemedicine is feasible provided that the moral and humanist values of medical practice are respected.

045 DOCTOR-PATIENT ELECTRONIC MAIL IN PSYCHIATRY

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Abstract Electronic mail (email) is common in Singapore with more than 1 million users. Its use in psychiatry and mental health discipline presents an unusual challenge. There has been no study on the use of email between patients and their therapists in mental health settings in Singapore.

This is a retrospective descriptive survey of 73 emails from 7 patients sent to a psychiatrist and psychologist collected over a 2-year period. The profile of the patients sending the email and the contents of the emails are described.

The varied uses, advantages and potential pitfalls of using emails in communicating with patients are discussed. Psychiatrists and other mental health professionals must be prepared for the challenges of using email in their professional work.

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046 AN INNOVATIVE CUSTOMER-CENTERED BUSINESS MODEL FOR PATIENT-CENTERED e-MEDICINE

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The web is transforming all business relationships. The evolution of e-commerce has progressed from a business (B) to customer (C) model (B2C) to the interactivity between two businesses, the B2B. Both models have been applied to aspects of health care with some early success. The X2X e-commerce models fail to recognize the multidirectional interactions, otherwise known as community. Network effect is optimized as the number of uses increases.

A business model is presented that puts the C (patient) at the center, BCB. This becomes (BCB) web to reflect the exponential effect of the web. The C (patient) is the ultimate customer in e-Medicine. This business model empowers the C to manage his or her own health and health care with web solutions and connectivity. Although health care processes are extremely complex & not customer-centered, this innovative business model will facilitate harnessing the power of the web to transform health care delivery.

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047 AN OVERVIEW OF THE UNIVERSITY OF KANSAS CENTER FOR TELEMEDICINE AND TELEHEALTH: THE DEVELOPMENT OF AN E-HEALTH PROGRAM

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To combat the challenges facing rural Kansas, the University of Kansas Medical Center began providing telemedicine services in 1991. Today, unique contexts of delivery include hospitals, elementary, middle, and high schools, hospice care, jails, prisons, group homes, mental health institutions, and home health care.

Currently, several Center projects are taking an e-health focus, including a web-based e-mail consult service, a web-site for children with cancer, online continuing education, and a web-enabled physician-to-physician process management initiative. The e-mail consult service for example, expands a two year initiative to connect physician preceptors to KUMC online resources to a web front end that measures interactions between physicians to assess effectiveness, amount of use, referral data, and satisfaction.

This presentation overviews the strategies utilized to evolve a traditional telemedicine program into an e-health care provider.

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048 FROM BIOMEDICAL TO PATIENT-CENTERED MODEL (PCM) OF e-MEDICINE

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Telemedicine (TM) is the use of real time connectivity between providers & patients for the purpose of providing care at a distance. The biomedical model (BM) is used. The efficiencies of TM and the Internet require a new model (systems and people based) to realize full potential. A new model is presented combining a PC M of medicine and the technology of connectivity. A pathway to transform the BM to a PCM/e-medicine is presented.

The components include:

1. Defining the experience of the illness.
2. Understanding of the patient as a person.
3. Finding common ground.
4. Enhancing the patient-doctor relationship.
5. Self-managed health & prevention.
6. Optimizing time limitations.

Information requirements are defined for each component of the PCM. A PCM information architecture is required to provide the optimal combination of technology-based, systems-based and people-based efficiency moves, which can decrease health care costs and improve population health.

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049 CONTINUING HEALTH TELE-EDUCATION FROM NOVA SCOTIA TO ST-KITTS

Michael Allen, Canada, Ian Jacobs, St. Kitts, Joan Sargeant, Canada. Dalhousie University, Halifax, Nova Scotia, Canada and Ministry of Health, St. Kitts.

Providing continuing education for health professionals between different countries poses several challenges. As in all continuing education, it is necessary to determine the learning needs of the target audience. However, it is also necessary to become familiar with differences in culture, health care systems and resources. In 1997 the St. Kitts Ministry of Health and Women's Affairs asked Dalhousie CME to provide continuing health education by videoconference. In January 1998 two educators from Dalhousie conducted a week-long needs assessment in St. Kitts. As a result, we planned to present 18 programs by videoconference covering cardiovascular disease, diabetes, leg ulcers and X-ray interpretation.

Despite support of the Ministry of Health, several attempts to present the programs failed. We could not establish a reliable videoconferencing link and other difficulties arose because of cultural differences and the inability to identify a local leader for the project. It was not until this leader was identified and we tried simpler technology that the project proceeded. In April 2000 we presented a 75-minute audioconference to approximately 40 health care professionals in St. Kitts. This audioconference was highly evaluated and we are seeking funding to present six more. Our experience shows that:
1) developing and implementing overseas projects take patience and determination; 2) a local champion is essential; and 3) simple technology may be more suitable than complex technology.

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050 TRANSFORMING CONTINUING EDUCATION MATERIALS FOR ONLINE LEARNING III: EVALUATING OUTCOMES

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The number of practicing physicians who have undertaken some online learning is increasing and may soon approach 50%. While online learning facilitates new forms of continuing education (CE), there is an online counterpart to every traditional form of CE.

Still, the format for online cme is often netcasting of clinical rounds. We have developed an online counterpart to four case based dementia modules. Guided by Hix & Harston's framework for courseware development, this online resource will soon be available to practicing physicians.

In today's presentation issues in conceptualizing the materials for online learning and the results of progressive beta tests will be reviewed before presenting an evaluation model.

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051 POST-GRADUATE MEDICAL TRAINING ON THE WEB: A TELEMATICS MODEL FOR CASE BASED LEARNING

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Background: The Internet is the ultimate expression of the Information Age, and the technology involved with its access is becoming wide spread. However, educational uses of this medium are still to be explored and better understood.
Objectives: Determine factors involved with the use of distributed meeting applications and assess the potential for increasing learning opportunities among rheumatology fellows through the promotion of peer collaboration.
Method: Three Internet Rounds Sessions were undertaken between Calgary, Winnipeg, Halifax and Montreal. Standard multimedia personal computers connected to the Internet through a LAN or modem dial-up connection were running computer conferencing software for sharing of application, video and sound communication. A total of five participants were involved in the three presentations of the following topics: Joint & Bone Manifestations of Diabetes Mellitus, A Difficult Bursistis, and Rheumatological Manifestations of Sickle Cell Disease. The presentations were adapted from previous rounds and seminars. Qualitative evaluation of the sessions was possible through on-line questionnaires, interviews and discussion.
Results: Presenters were able to present the material and moderate questions and discussion throughout the presentation. The sessions were carried out satisfactorily despite technical difficulties related to sound transmission and the display resolution of X-ray images.
Conclusion: Internet Rounds Sessions using distributed meeting applications can promote peer collaboration and increase learning opportunities. Case presentations of short duration (less than 25 minutes) seem to be more suitable to this kind of sessions compared to topic reviews and longer sessions.
Further study is required to better explore the potential of the Internet for CME opportunities as well as for peer collaboration.

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052 PIAGET MEETS YAHOO: USING THE INTERNET TO PROMOTE KIDS' PSYCHOSOCIAL DEVELOPMENT

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Pediatricians and Child Psychiatrists have been slow to recognize the importance of the Internet in influencing children's values and learning styles, just as they ignored the impact of television on children for 25 years. According to the Annenberg Survey in the US and the Media Awareness Survey in Canada, most parents recognize Internet literacy to be key to their children's success in the marketplace of tomorrow. However they are also confused by the Jekyll and Hyde depiction of the Internet in Print media and afraid that introducing online access into their home might result in a loss of parental influence and erosion of family values.

The author of taking Your Kids Online: How and When to Introduce the Internet to Kids and founder of Ability OnLine will present a step-by-step developmental approach to parenting in the digital age, based on the Piagetian Theory of neuromotor and cognitive development, as well as ten years of clinical experience using email for therapeutic purposes in pediatric rehabilitation.

This approach emphasizes positive, preventive parenting, as opposed to the false security provided by filtering software and lists of "Don'ts". The Internet offers unlimited opportunities for parents to teach kids an arsenal of critical thinking skills which they can apply in many other life situations. However parents need to take into consideration their own children's interests and cognitive maturity, as well as family context and values in determining the right time and place to introduce different elements of Internet literacy in their own home. Technology has changed a great deal in the past decade, but good parenting has not and parents are in the best position to teach children good judgment.

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053 OVERCOMING THE TECHNOPHOBIA OF CHILD PSYCHIATRISTS: WHAT WORKS AND WHAT DOESN'T

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Two years after the introduction of free Internet access for all full-time staff, in a large and world-renown pediatric hospital in Canada, there was still widespread mistrust of the Internet and online communications among the medical staff. A telephone survey revealed that staff psychiatrists lagged significantly behind their pediatric and surgical colleagues in use of the hospital Intranet and Internet access.

A traditional, CME-type approach to this problem along with the development of a central web page for the Department of Psychiatry at the University of Toronto was our first approach. Only residents and junior staff made use of this site. Site Psychiatrists declared themselves "too busy" to have time to incorporate the Internet into their practice or teaching.

This reluctance to embrace technology was examined in the context of the four distinct cultures of the Hospital for Sick Children, in Toronto. A radically new approach to web development and promotion was clearly needed, one that would demonstrate to academic psychiatrists, not only the invaluable research resources of the Internet, but its potential as a time-saver for clinicians with a busy practice and overloaded voice-mail boxes. This paper will outline and discuss the evidence that succeeded (or not) in convincing Child Psychiatrists to consider the Internet as an important adjunct in patient education and care.

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054 VIRTUAL IN-HOSPITAL PRIMARY SCHOOL AND COMMUNICATION SYSTEM FOR HOSPITALIZED CHILDREN

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Hospitalized children can attend the class in in-hospital primary school (IPS); however, it is difficult for them to attend every day because of their medical treatments or physical condition. In addition, separation from their parents causes stress and weakens their natural healing capabilities.
We propose a virtual IPS and communication system using cyber space and an Internet-based connectionless communication system (CCS). The use of cyber space and the CCS aim to provide hospitalized children with a virtual classroom, and with a new means of communication that can help them with their emotional and medical challenges.
Children who are admitted to hospitals that do not have an IPS can attend virtual classes and communicate with their parents at any time from their sickrooms over the Internet.

The system has the following features:

1. In cyber space, children can communicate with other children, teachers and virtual pets, can attend classes and can play tag or other games.

2. Using the CCS, they can see a static image of home at fixed intervals and get a sense of mother and home. In addition, when he/she says "Mamma", the system will recognize this and send the voice to the home, and then   video communication will start.

Young patients at the Nat. Children's Hospital in Tokyo Japan have been using this system and attending a virtual mock class since October 1999. This presentation will demonstrate the system's parameters, effects on children and usability of the system.

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055 **IMPACT OF TELEHEALTH UPON PHYSICIAN RETENTION AND RECRUITMENT**

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Introduction: Many factors contribute to physicians' decisions to move to and/or remain in rural communities. Availability of telehealth services, both clinical teleconsultation and videoconferenced CME, may be one of these factors. The purpose of this study was to determine the importance of telehealth in the retention and recruitment of physician services in rural communities, relative to other factors.
Methods: The target population included physicians in the Eastern Region of Nova Scotia. This region was selected because telehealth services have been available longer than in other regions. We conducted a literature search to guide the design of the questionnaire, compiled of 45 closed questions and one open question. We generated descriptive and comparative statistics, and used content analysis for qualitative data.
Results: The return rate was 47%; 66 of 140 questionnaires were returned. Of respondents, 55 (83%) had attended videoconferenced CME sessions and 30 (46%) had referred patients for telehealth consult. They rated these services as valuable educational and clinical supports. Generally, respondents rated telehealth services as being less important than other factors which affect a physician's decision to remain within a community, but physicians in rural communities rated them more highly than those in more urban communities. These and other results will be discussed and conclusions drawn.

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056 **IMPACT OF TELEHEALTH UPON PHYSICIAN RECRUITMENT AND RETENTION IN RURAL AREAS**

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Beginning with various healthcare reforms in NS in 1994, many family physicians out-migrated from rural NS. They were fearful that acute care facilities would close, access to specialist care and support would dramatically diminish, and their ability to take away from their practice would become virtually impossible. From Jan/94 until Dec/96, Nova Scotia lost 167 practicing physicians.

As part of a Physician Recruitment and Retention Strategy N.S.'s Department of Health decided to implement a telehealth network. A 1996 Pilot Project linked five NS communities to deliver three telehealth services - teledermatology, teleradiology and continuing medical education (CME). Systematic evaluation demonstrated that telehealth increased access to healthcare services, improved quality of healthcare and resulted in high user satisfaction.

Subsequently, a province-wide Nova Scotia TeleHealth Network (NSTHN) was established, linking 42 acute healthcare facilities and the Medical School at Dalhousie University. Services offered include teleradiology, teledermatology, telelearning, CME/CNE, telepsychiatry, televascular surgery, telegeriatrics, teleorthopedics, telepediatrics, and teleinternal medicine. Since Jan/98 more than 26,000 total transactions have occurred making NSTHN one of the busiest networks in NA.

Telehealth has improved access/timeliness of radiology reporting, provided physician access to emergency and urgent-case specialist support, and as well as improve physician access to CME.
The number of physicians in NS has increased by more than 180 over the past two years. NS now has a ratio of 1 physician: 480 population - the second highest in Canada. Telehealth delivered via the NSTHN has played a significant role in NS's physician recruitment and retention strategy.

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057 EXPERIENCES IMPLEMENTING TELEHEALTH IN REMOTE COMMUNITIES ACROSS CANADA

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Canada is an expansive country, with most of the population living in urban areas. The communities referred to in this presentation are remote and isolated, and it is these areas of Canada that will benefit the most from Telehealth.

As a Project Manager with a telehealth systems provider, I have had the opportunity to implement systems and programs in many remote communities in Canada's North. These communities presented their own challenges for implementation. I have gained valuable knowledge of the importance of understanding the cultures that define each community. By understanding these diversities, I have been able to successfully implement telehealth pro-grams into the communities.

Presented is a summary of these implementation experiences by which case studies will be discussed comparing and contrasting telehealth implementations in these various remote communities.

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058 MANAGING WESTNET TELEHEALTH EXPANSION: A GOOD PROBLEM

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WestNet Telehealth was established to meet the challenge of providing greater accessibility to healthcare and health education in the NWT's remote environment. From inception, in June, 1998 to May, 2000, WestNet has had 656 clinical consultations and 246 non-clinical sessions (mainly continuing ed with over 1500 participants). Because of its success, the GNWT actively supports further Telehealth expansion. Controlling site and service expansion while continuing to deliver high quality healthcare is what is termed as a 'Good Problem'.

This presentation highlights the application of the Enrolment Package, which supports WestNet in sorting new applications, assessing their readiness and prioritizing them for implementation.

Issues are:

> WestNet marketing and promotion at community level
> Telehealth service needs assessment surveys
> New site and service selection, benchmarking and evaluation parameters development
> Session scheduling
> New service evaluation process including outcome measurements
> Misc. documentation: patient consent, and WestNet ad hoc service request
> Reporting process

To conclude, the Enrolment Package provides structure for WestNet's 'Good Problem' management.

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059 ESTABLISHING A CLINICAL TELEHEALTH NETWORK IN AUSTRALIA NSW TELEHEALTH INITIATIVE — SUSTAINED & VIABLE

Deborah Oong, NSW Health Department, North Sydney, Australia.

How does Australia provide specialist health care to people living in rural & remote areas of NSW (a state of Australia) when the vast majority of medical specialists have their practices between 200 to 800 kilometres away?

The NSW Telehealth Initiative commenced in 1996 and has assisted meeting the health needs of people, particularly those living in rural & remote areas of NSW. Since then it has (and continues) to expand to provide one of the largest clinical telehealth networks in the world. In December 1999 it supported a range of clinical specialities, through a variety of health care facilities at 61 sites across the state. By December 2000 it is expected that the range of clinical specialities will be expanded and these services will be delivered to over 100 sites. Future plans for the NSW Telehealth Initiative include the rapid expansion of telehealth sites, integration of more clinical specialities, as well as developing a networked medical imaging framework to support rural and remote practitioners. This will guarantee access to health services to every person in NSW.

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060 BUILDING A TELEHEALTH NETWORK: TOP 10 FACTORS FOR SUCCESS

Karen Levesque, Audrey Huziak. Northern Telehealth Network, Saskatoon, Saskatchewan, Canada.

Information and communications technology is changing health care delivery across Canada and the world. It has the potential to change people's lives, particularly in rural and remote communities.

The Northern Telehealth Network has successfully introduced the people of Saskatchewan, a sparsely populated mid-western Canadian province, to this remarkable technology - and lives and communities have been changed!

Beginning as a eight-site network over a large geographic and culturally diverse area, the NTN has developed its program in an organized and strategic manner. In developing a new program, particularly across diverse Health Districts separated by many miles and using leading edge technology, it would have been easy to fail.

The Northern Telehealth Network has found the recipe for success in developing a network. A review of the top ten factors for successful implementation of a telehealth network will be discussed, with an emphasis on developing the program across several Health jurisdictions.

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061 FROM LEFT-FIELD TO CENTRE-FIELD BRINGING TELEMEDICINE INTO MAINSTREAM MEDICAL PRACTICE

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Although telemedicine has been available for four decades, it has not yet gained acceptance in mainstream medical practice. Historic barriers included high costs, inconvenient studio locations, physician remuneration issues, and lack of knowledge about the technology.

Recent reductions in equipment and telecommunication costs have brought telemedicine within reach of rural health centres. The next iteration of telemedicine will bring remote consultations directly to the desktop, allowing physicians to schedule remote consultations more efficiently. Physician remuneration has been addressed by alternate payment plans, provincial fee schedules in some Canadian provinces, or in the case of the NORTH Network, physician reimbursement directly from the program budget.

Results of the NORTH Network program evaluation indicate high patient and provider satisfaction. Most other programs also report high satisfaction rates. A follow-up survey of referring physicians indicated that 95% of patients referred for telemedicine, did not require a subsequent face-to-face consultation.

A final consideration is the cost savings generated by telemedicine. Enhanced and timely access to specialty care may improve health outcomes and reduce hospital stays. Patient-reported costs to attend a teleconsultation were $10 as compared to $300 for out-of-town travel. Savings in government travel subsidies for out-of-town treatment will offset some of the long distance teleconsultation costs. Dependence on visiting specialist programs may also be reduced.

These findings, coupled with affordable technology, pave the way for telemedicine to become as unremarkable as the telephone in everyday medical practice.

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062 TELEMEDICINE IN AN INTEGRATED HEALTHCARE SYSTEM

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Clalit Health Services operates for 89 years a comprehensive health insurance and Healthcare delivery system. With 3.6 million members it comprises 60% of the Population and manages a health delivery system of 1250 clinics, 400 pharmacies, 14 hospitals and 30,000 employees. It also buys services from external hospitals and suppliers with total budget of USD$3.5 billion!

Eight separate regions and the hospitals are supervised and managed by a central Management.

Information Technology is becoming a key instrument to achieve an effective and Economic management.

This paper will describe the key issues of the system. The goal is to develop and Operate an integrated system with an infrastructure of "tables of organization" of the whole system based on medical files, laboratories, manpower management, RIS & PACS, budgeting and finances and logistical support. All of this has to be Supplemented by systems of redundancies and authentication and must operate with a variety of interfaces with the end users.

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063 **CHILDREN'S TELEHEALTH NETWORK: SUCCESSFUL INTEGRATION OF TELEHEALTH - REGION 3 HOSPITAL CORPORATION EXPERIENCE**

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The Children's TeleHealth network (CTN) is an inter-provincial network that provides support to children, women, families and health care providers. CTN is an initiative of the IWK Grace Health Centre in collaboration with health-care centres, TecKnowledge Healthcare Systems, and teleco providers.

In Winter 2000, CTN was expanded to the Region 3 Chalmers Hospital, Fredericton, N.B. The implementation methodology included project management, telehealth assessment & design, policy development, training, & clinical validation. The process involved administrators, health records, risk management, pediatricians, child life, nursing, information management, clinical engineering, patient registration, radiology, & education/multi-media. Benefits realized include improved timeliness in care management, decreased time from school & work for children & families, enhanced transition planning between facilities & home, support of quality care, & ongoing education.

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064 **TELEMEDICINE IN CHILD PSYCHIATRY: PRACTICES, POLICIES AND POTENTIALS IN CANADA'S MARITIME PROVINCES**

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For two-and-a-half years a regional children's hospital has provided child psychiatric consultations, using the Children's Telehealth Network, to a number of child mental health clinics in Canada's three Maritime Provinces. The service is designed to be an extension of ongoing travelling child psychiatry clinics and is provided 'live' to the local mental health clinic team. Various combinations of patients, families, agency staff and mental health professionals are participating in telepsychiatry interviews.
Policies and procedures are in place to deal with confidentiality, consent, psychiatrist responsibilities and accountability, and, we appear to be the first to have a formal contract with another province that defines an inter-provincial service. Smooth functioning depends on high quality organizational support, pre-arranged objectives and proper focus for the consultation sessions.
The service is being evaluated continuously by providers and recipients using questionnaires and focus sessions via telehealth.
Current and projected service demands provide the opportunity if not the necessity for innovation and expansion, including home-based applications.

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065 A MOTHER-CHILD NETWORK:
AN INNOVATIVE INTERHOSPITAL CARE DELIVERY SOLUTION USING TELEMEDICINE

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Introduction The Canadian health system is in the midst of change, and Québec is not immune to this crisis. Shaken by mergers of institutions and significant budget cuts, the Québec health system has had difficulty adjusting to these profound transformations. Amid these upheavals, however, there has emerged a firm determination to ensure that our health system adapts to new realities, and one means of doing so has been the recent implementation of an ATM (asynchronous transfer mode) telemedicine network linking 36 Québec hospitals. Within this context, Hôpital Sainte-Justine has embarked upon a major organizational transformation in the wake of its being officially designated a mother-child university hospital centre—thereby evolving from a traditional hospital into a "wall-less" hospital integrated into an inter-hospital network. The particularity of this network is that it integrates a number of new telecommunications technologies: telemedicine in conjunction with a website and a shareable multimedia medical file. This paper analyses the role played by these new technologies in the deployment of an integrated care delivery system designed to better serve pediatric patient groups, both locally and in remote regions.

Problem Telemedicine has attracted much attention in recent years. Despite this, a number of pilot projects, though they comprised significant advantages on paper, have failed to achieve expected results and, often, have been discontinued once funding ran out. Indeed, despite the promise of significant benefits, development of telemedicine solutions poses major technological, organizational and human challenges. Québec possesses characteristics that make it well suited to the establishment of a telemedicine-supported mother-child network: its territory is vast, many regions of the province are sparsely populated, and the vagaries of climate can exacerbate the isolation of certain communities. Pediatric specialists in the province are mainly concentrated in two metropolitan areas, Québec City and Montréal. Hôpital Sainte-Justine, in Montréal, is the principal centre for delivery of specialized care for children and expectant mothers: 60% of patients come from outside Montréal. Many families must travel great distances for consultations and treatment. This is the context that led to the establishment of the Mother-Child Network in 1996. The network has several goals: reduce inequalities in terms of accessibility by delivering services as close as possible to children's homes; provide continuous care by means of better synergy between teams at Hôpital Sainte-Justine and those in other regional hospital centres; improve the quality of care provided to mothers and children through development of shared approaches to health care; and ensure the sharing of care protocols by means of a website accessible within the network.

Organizational solution The particularity of the Mother-Child Network is that it creates a virtual network of organizations able to concurrently and sequentially treat a single remote patient. The network comprises more than fifteen hospitals committed to improving care delivery to children and mothers. The organizational challenge is to develop efficient coordination between multiple health-care facilities and groups of professionals (who must give up a part of their managerial independence), while ensuring the mobilization of wider support in terms of expertise rendered accessible via a new medium, telemedicine.

To meet this major challenge, the Hôpital Sainte-Justine team has opted for an innovative organizational solution. Distinct telemedicine networks are being developed and customized for each sector so as to deliver technical solutions that are as simple as possible as well as being most adapted to current operations, to account for the particularities of the specializations in question. Presently, four different sites are operational, covering five sectors: pediatric cardiology, in which consultations and remote follow-up of ultrasound have been in place for two years now; radiology; speech therapy, for which treatment and remote assessment is now possible; child psychiatry, which uses the same platform as speech therapy; and, lastly, a dedicated teaching room, established for use in all specializations. Three more sites were slated to become operational by the beginning of 2000. To get these various networks up and running, Hôpital Sainte-Justine had to settle a number of key organizational issues: establishment of a dedicated team of biomedical engineers and technicians, on call; adoption of policies and procedures to ensure the respect of privacy and the addressing of the medico-legal issues raised by the use of telemedicine; modifications to physicians' mode of remuneration; a firm commitment of the part of upper management to making recurrent operational budgets available; and establishment of a research/assessment team that would work in harmony with the hospital team.

Conclusion This paper outlines the clinical, organizational and technical solutions that appear likely to be useful in supporting a pediatric care mother-child telemedicine network that would be well positioned to attain the goals stated above.

066 THE COMPLEXITIES OF SCHEDULING ON A 41 SITE TELEHEALTH NETWORK

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Between July of 1997 and March of 1999, the first province wide telehealth network in Canada, the Nova Scotia TeleHealth Network (NSTHN) was implemented. This PC-based network connected 42 healthcare facilities throughout the Province. The Eastern region (16 sites) was the first to be implemented and the scheduling function was managed from a regional perspective by the regional telehealth coordinator. As the three additional regions and one additional site in the Eastern region (26) were added, requests for cross regional telehealth sessions grew. It soon became evident that there was a need to centralize and automate scheduling on the network.

Scheduling activities on a large multisite telehealth network can be a challenge. This presentation will describe the methodology used by TecKnowledge Healthcare Systems in moving scheduling from a decentralized to a centralized process. The realities of effectively transitioning to a centralized scheduling process will be described in detail. Progress and benefits on moving from a centralized manual process to a web-based environment will be discussed.

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067 TELEHOME CARE: THE WEST PRINCE TELEHOSPICE PILOT PROJECT

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The overall goal of the Prince Edward Island (PEI) Home Care and Support Program is the prevention of unnecessary, premature or prolonged institutionalization. Before implementing telehome care, services were only provided from 9 am - 5 pm daily. The West Prince Telehospice Pilot Project was initiated to investigate the benefits of: 1) placing telehome care technology in the home of palliative patients and 2) providing patients with 24 hour access to a home care nurse. Objectives include decreasing the number of home visits, doctor visits, ER visits and hospitalizations, and to obtain a high level of patient and care provider satisfaction. The technology chosen was the American Telecare Aviva system, with a blood pressure cuff and stethoscope connected to the patient's unit. A single, analog telephone line is used to connect the units. Twelve palliative patients will be enrolled in each arm of the study. The intervention group will have a telehome care unit placed in their home and receive instruction how to operate it. A home care nurse will call the patient using the telehealth system on a scheduled basis, e.g. usually daily, plus provide home visits as needed. The patient will also be able to telephone an on-call home care nurse at any time. The control group will receive standard care, e.g. in-home care and the ability to call the nurse between 9-5 every day. For the analysis, questionnaires will be given to the home care nurses, patients and care givers before, during and after the project. Semi-structured interviews will also be conducted with all groups. Responses from the questionnaires and interviews will be compared. Preliminary results from the first 6 months of data collection will be presented at the conference.

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068 TELEHEALTH FOR PALLIATIVE CARE: THE VIEW FROM HERE

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Palliative care, according to the World Health Organization, is the "active total care of patients whose disease is not responsive to curative treatment. The goal of palliative care is achievement of the best quality of life for patients and their families."

The need for palliative care services in Canada is expected to continue growing in Canada during the next several decades. [Population health statistics]] "indicate an increase in the number and percentage of deaths in Canada, the growth of the aging population with long term chronic diseases, and rising rates of disease such as cancer, AIDS, and cardiovascular impairment in the general population." (Quality End-of-Life Care: The Right of Every Canadian, Standing Senate Committee on Social Affairs, Science & Technology, June 2000).

Although palliative care has traditionally been regarded as a health discipline that is focused on caring rather than curing, "high tech" does not preclude "high touch." In fact, within the palliative care community, there is a growing interest in the use of new technologies such as telehealth to deliver both clinical services and education.

The University of Ottawa Institute of Palliative Care is a Canadian academic centre for interdisciplinary research and education in palliative care. During the past year, Institute faculty and their partners in the community have been using telehealth administratively and also to deliver palliative medical education to rural areas. This activity has been partially funded through a grant from the Ontario Medical Association's program for Rural & Isolated Physicians. Telehealth is gradually being integrated into the Institute's outreach programs.

According to a systematic review of patient satisfaction with telemedicine [BMJ 2000;320:1517-1520 (3 June)] there is still a lack of published literature documenting the safety, cost effectiveness and efficacy of telemedicine as it relates to patient satisfaction. And although telehealth appears to promise benefits for palliative care practitioners and patients in rural areas, much work remains to be done — especially in the area of evaluation. Palliative care must also move beyond a "pilot/feasibility study" mindset to one of implementation and sustainability.

In this presentation, these issues will be discussed.

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069 TELEHOMECARE: PILOT APPLICATIONS AND BUSINESS PERSPECTIVES

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Telehomecare for health/social applications is moving from pilots to larger scale implementations. Key trends are identified, experience from pilot applications, synthesised, business opportunities identified. Life expectancy increases, better informed patients expand demand, the prevalence of costly, chronic diseases accelerates, technical/medical progress opens up new opportunities. Data show homecare can lead to better medical outcome and quality of life, reduce costs.

An analysis of evaluation results from European projects by empirica and from hands-on experience follows: the hausTeleDienst, the world-wide first interactive (CATV-based) HomeTeleService; a video service for dialysis patients; experience from providing mobile home carers with a mobile telephone connected to a laptop and a digital camera. User acceptance, impact on quality and efficiency of services, performance of technology will be assessed. A business case for moving from a functional disabilities focus to a holistic needs-oriented focus is developed.

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070 EVALUATION OF A POST CARDIAC SURGERY TELEHOMECARE PROGRAM

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In the mixed urban and rural province of New Brunswick, specialised cardiac services are provided only by the New Brunswick Heart Centre (NBHC) in the south of the province. It has been suggested that the high cost of cardiac care, the increasing number of ageing cardiac patients, and recent and continuing advances in technology, make telehealth "the key to meeting tomorrow's home health needs". This premise was evaluated for a telehomecare component of the VITAL (Virtual Interactive Telehealth Assistance Links) program, a private-public partnership.

Pre-VITAL there was no systematic follow-up of patients between the time they were released following their operation (5 - 6 days post-op), until asked to attend the NBHC for a 'post cardiac surgery assessment' (6 weeks post-op). VITAL introduced an entirely novel program, with 'remote visits' using a POTS based hospital-to-home video-interactive unit, and peripherals for basic clinical data (3 lead ECG, blood pressure, SpO_2). Regular appointments were made for the 'remote visits', but 7/24 access was available for patients.

The program is clinically valuable, offers greater and simpler access, enhances quality of care, and appears to reduce 're-access' rates during the immediate post-discharge period. The quality of life for both the study and control groups was similar, and patient, caregiver, and clinician satisfaction was extremely high.

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071 TELEMONITORING OF CONGESTIVE HEART FAILURE PATIENTS : THE TEN-HMS-PROJECT

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The objectives are to improve medical outcome for CHF patients: quality of life, and efficiency of healthcare processes.

Vital data (weight, pulse/rhythm, blood pressure) monitors interface with cordless communications. Data are securely transmitted to a medical service centre. This world wide unique telemedical research experiment covers 200 randomly selected patients plus two random control groups of 200 patients supported by a telephone service and 100 patients treated in a conventional fashion in Germany, Netherlands, United Kingdom.

Leading cardiologists in 12 hospitals - who provide the telemonitoring service centres - specialists and GPs are involved. All data are collected and analysed by an independent institute. The study will furnish statistically reliable info:

Primary outcome measure is bed-days occupancy in acute medical beds.

Secondary outcomes include a composite measure of patient well-being, Best Medical Therapy Score, costs of care and mortality.

High level political advisory boards accompany this study.

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072 VIDEOTELEPHONE TRIAL FOR PALLIATIVE AND ANTI-NATAL CARES

Masako Miyazaki, Michelle Stuart, Marj Sandilands, Marianne Stewart, Clayton Knoll. University of Alberta, Edmonton, Alberta, Canada. Telehealth Technology Research Institute, Edmonton, Alberta, Canada.

In Canada, there are several existing projects which are utilizing a range of equipment from a telephone information line equipped with high performance diagnostic software to a Tele-monitoring device that can transmit vital signs and data over the telephone line. Currently, Tele-homecare projects in Canada are primarily directed at Tele-monitoring and Tele-consultation following a visit to the hospital or as a replacement for a visit.

We have identified two groups of homecare patients; palliative and anti-natal groups for this project. There were two major aspects to this trial: one is to evaluate the technical aspect and the other is to evaluate human aspect of videotelephone use.

1. Technical evaluation of a videotelephone
   a. Installation:
   b. Training:
   c. Operation:
   d. Support:
2. Feedback from users
   a. Operation:
   b. Service impact:
   c. Cost and benefit analysis:
   d. Impact assessment:

Feedbacks were collected from technical staffs; homecare workers, patients or patients care providers at home. A summary of this research result will be presented at this conference.

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073 FINAL REPORT AND RECOMMENDATIONS OF THE G-8 GLOBAL HEALTHCARE APPLICATION SUB-PROJECT 4

André Lacroix, Canada, Louis Lareng, France, Dittmar Padeken, Michael Nerlich, Germany, Jay Sanders, USA, James McGee, Richard Wootton, UK, Yoich Ogushi, Yoshikazu Okada, Japan, Marcello Bracale, Italy, Sandra Prerost, Australia, Oleg I Orlov, Russia.

The main objectives of the G-8 Global Healthcare Applications sub-project 4 was to enable an "International Concerted Action on Collaboration in Telemedicine". To promote and facilitate the implementation of telemedicine or health telematics networks around the world, it was felt necessary to solve certain key issues. Five thematic solution-seeking FORUMS each addressed a specific key issue including: interoperability of telemedicine and telehealth systems, impacts of telemedicine on health care management, evaluation and cost effectiveness of telemedicine, clinical and technical quality and standards, and medico-legal aspects of national and international applications.

More than 650 invited participants coming from up to 16 countries attended the five FORUMS of 2-3 days duration each to address the key issues. Based on the discussions and reflections which followed plenary review presentations and working group discussions held during these FORUMS, a series of recommendations were prepared by the national representatives of the GHAP G8 sub-project 4; these recommendations propose to the political leaders and healthcare managers of G8 and other countries paths to follow in order to accelerate the achievement of a Global Society in Healthcare via Telehealth and Health Telematics.

The fields of telemedicine and health telematics are emerging and complex; their full integration in healthcare delivery will require years of concerted efforts to solve some of the issues identified by this working group. Continued collaboration between members of this working group and other experts in the field should be pursued in synergy with international organizations in healthcare. A summary of the conclusions and recommendations will be presented at this conference.

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074 CHALLENGES OF INTERNATIONAL TELEMEDICINE

Ken George. TecKnowledge Healthcare Systems Inc., Dartmouth, Nova Scotia, Canada

This presentation will discuss real life difficulties encountered by TecKnowledge personnel while establishing telemedicine and teleradiology installations in Saudi Arabia, the Caribbean and the Canadian north. Such installations are seldom straightforward, being complicated by environmental, logistical, political, social and financial factors that turn a seemingly standard installation into a test of technical and social skills for the vendor. The author will describe the difficulties encountered in various installations, the solutions provided, and the final outcomes of the projects.

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075 INTERNATIONAL VIRTUAL e-HOSPITAL OF KOSOVA

Rifat Latifi[1], Michael Nerlich[2], Ricky Richardson[3], Charles R. Doarn[1], Abdulrahman A. Al Nuaim[4], Peter Range[5], Ronald C. Merrell. [1]Dept of Surgery & Medical Informatics & Technology Applications Consortium, VA, USA; Virginia Commonwealth University, Richmond, VA, USA; [2]Regensburg University, Regensburg, Germany; [3]Great Ormond Street Hospital for Children, London, UK; [4]King Faisal Specialist Hospital & Research Centre, Riyad, Saudi Arabia; [5]Motion Media Technology, Bristol, UK.

Background: One year after the war ended in Kosova, the basic medical needs of 2 million people are still not being met. Hospitals are crowded, infant mortality is the highest in Europe, infectious diseases are devastating, the region is plagued by injuries from land mines and the most common diseases and cancer are diagnosed in their late stages.

Hypothesis: The development and applications of Telemedicine in Kosova will have a significant impact on the delivery of healthcare services. It is hypothesized that the creation of an International Virtual e-Hospital of Kosova, will significantly improve the healthcare of people in the region by applying Telemedicine systems and solutions and by thus providing enhanced medical care to the most remote areas of Kosova. Furthermore, this will be a model for future rapidly deployable international Telemedicine units in disaster areas throughout the world.

Methods: This idea was introduced at the final conference on the G-8 GHAP held in Berlin, May 4-5, 2000, in a session on Telemedicine in Kosova the creation of the International Virtual e-Hospital of Kosova (IVe-HK) was conceived.

Results: The idea was widely accepted by conference participants, and by officials of the Health Ministry of Germany. Representatives from many countries such as Germany, England, Japan, Saudi Arabia and Canada offered to provide concrete help in establishing the Virtual e-Hospital of Kosova. Today, the hospital is in its first phase of development, which includes the creation of the IVe-HK, and education of the local physicians in the use of telemedicine. A Telemedicine Association of Kosova was also established. In the next phase, seven remote areas of Kosova will be linked via the ISDN to the Prishtina site. For now the IVe-HK will be linked to four medical centers in Richmond, Virginia, USA, Regensburg, Germany, London, UK and Riyadh, Saudi Arabia. For Telemedicine Consultations store-and-forward techniques or direct teleconferencing approaches via ISDN and/or satellite will be utilized.

Conclusion: If the initial reaction of this proposal for a Virtual e-Hospital in Kosova is met with continued enthusiasm and materialized by concrete action it will have significant impact on healthcare of Kosova. In addition this project will serve as a model for rapid creation and deployment of an Internationally led Telemedicine units in any disaster area in the world.

076 MULTINATIONAL DISTANCE LEARNING PROJECT UTILIZING LOW BANDWIDTH INTERNET.

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MITAC, Department of Surgery, Virginia Commonwealth University, Richmond, VA USA.

Objective: Collaborative projects in distance learning have been designed by the Medical Informatics and Technology Applications Consortium (MITAC) and its international partners to provide an educational experience for medical and graduate students in Russia, Ukraine and Armenia via low bandwidth Internet technology.
Materials and Methods: The initial set of 6 lectures on Immunology has been delivered through the MITAC web site using low bandwidth Internet in 1999. Initial student and faculty reaction was positive and requests for close curriculum coordination have led to continuation of the project. A surgical course began on a regular basis in the spring semester of 2000 with 2 live lectures on selected topics. All lectures were recorded on video and digitized prior to placement on the web. Medical and graduate students from Russia, Ukraine and Armenia viewed lectures and participated in multipoint PC web-based video teleconferencing using CU-SeeMe software Three (3) participants on MITAC including lecturer, an international telemedicine coordinator, and technical person conducted live Internet based sessions. Average of 15 to 30 students among them practicing and in-training physicians participated in live on-line sessions. Results: Comprehensive interaction occurred in 7 out of 8 on-line sessions between students and teachers. Structured questionnaire has been designed to evaluate the learning process. Among 18 evaluated participants 88% were comfortable with the content, the flow of the question/answer sessions and during sessions; 66% were not satisfied with the quality of video and audio but identified a new diagnostic algorithm and 50% of students stated they would like to attend next sessions with the same format.
Conclusion: Extensive and clear communication regarding goals, content of lectures, context for online discussion, delivery methods and language support are critically important in realization of these projects. The process of acquiring the international medical culture and compatibility during on-line sessions is complex, and needs to be addressed. Our experience provides baseline for the development of mutually interactive, international distance learning program that might be of a significant value to those institutions that are focused on delivering contemporary up-to-date education materials in the field of basic science and specific health care issues.

077 MOMEDA — A MOBILE SMARTPHONE TERMINAL FOR DICOM IMAGES AND WEB-BASED PATIENT DATA

J. Reponen, J. Niinikmäki, A. Holopainen, P. Jartti, E. Ilkko, A. Karttunen, T. Kumpulainen,
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Mobile medicine supplies information to the point-of-expertise. The purpose of MObile MEdical DAta was to build a pocket terminal to X-ray and patient record archives.
DICOM images are converted to JPEG format. Together with EPR narratives they are pushed to the mobile unit using GSM. Data security is taken care of. The client (a Nokia communicator) has a X-ray image viewer. Thumbnails and patient record text can be reached. The full size images can be manipulated, e.g. Hounsfield units can be measured.
115 CT and MRI scans were evaluated by radiologists and neurosurgeons. Working time and results form a reference reading were recorded. The users were interviewed.
Sending a head scan took on the average 28 min. The neurosurgeons. used on the average 11 min for reading. The consultants considered 38 % of the cases ready for final diagnosis and 62 % ready for preliminary diagnosis. The users accepted the system well except that more speed was wished.
Our demonstrator showed that a pocket-sized teleradiology terminal enables emergency CT consultations. The future technical improvements will solve technical bottlenecks.

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078 ROLE OF FRENCH SPATIAL AGENCY IN TELEMEDICINE

René Rettig (MEDES), Laurent Braak (MEDES) Antonio Güell (CNES). Toulouse, France.

MEDES is a subsidiary of the French Spatial Agency CNES. It is a "Groupement d'Intérêt Economique" according the French law, linking CNES, the Toulouse Hospital University, and 6 large universities as Bordeaux, Tours, Lyon, Toulouse, Clermont-Ferrand and Saint Etienne.

MEDES is involved in many fields concerning manned space flight and mainly in operational Space medicine, research in physiological functions related to microgravity, assessment in clinical use of biomedical devices coming from Space research and development and Telemedicine.

MEDES has worked very soon using Telemedicine tools in Space environment. It was a good way for MEDES to be in contract with ECC with the purpose to describe how to make a business in Health field using Internet technology. It was the "TEN TELEMED project" performed from 1997 to 1999.

Recently, the French government asked CNES Space applications offered to the civil society. Telemedicine is one of the main applications if we consider that NICT are a key to get better access to Health care. MEDES had worked beside CNES as a secretary of a working group in charge to identify and describe the Telemedicine applications supported by Space technology. The present paper objectives are to communicate:

    (1) The results of the CNES TELEMEDICINE WORKING GROUP highlighting few domains where Space technologies seem to be able to bring decisive advantages:
        (a) tele-consultation,
        (b) health education,
        (c) monitoring of disabled persons,
        (d) epidemiology.
    (2) The methodology used to promote these applications through active demonstrations supported by CNES.
    (3) The actual state of the work with two applications:
        a) tele-consultation with a Telemedicine portable station and,
        b) merging epidemiological data and satellite observation data to have predictive behavior against endemic pathology in developing countries.

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079 USING THE INTERNET TO IMPROVE CARE DELIVERY

William S. Kazman. Global Telemedix Inc., Wakefield, MA, USA.

Mr. Kazman will speak on the dramatic impact of eHealthcare and using the Internet to enhance and extend patient care, improve the care delivery workflow and create greater efficiency and value for medical providers.

He will discuss how physicians, group practices, and integrated delivery networks will benefit from having access to valuable clinical data anytime, anywhere on the Web, while improving return-on-investment on clinical diagnostic equipment and consulting specialists. He will introduce an industry-leading eHealthcare platform, TeleConsult®, which is currently undergoing beta testing at eight leading U.S. medical institutions, including the University of Chicago Medical Center and University of Michigan Health System.

Global Telemedix is a member of the Microsoft Healthcare Users Group and works with a growing list of premier industry leaders, Dell Computer, Digital Broadband Communications, Inc. and Exodus Communications. For more information about Global Telemedix, please visit www.globaltelemedix.com.

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080 ANALOGOUS ENVIRONMENTS AS TELEMEDICINE TESTBEDS: EXPERIENCE AT DEVON ISLAND

Brett Harnett, Charles Doarn, Ronald Merrell. Virginia Common Commonwealth University, Richmond, VA, USA

Telemedicine is a significant tool in the delivery of health care in the space environment. To better understand how telemedicine can be applied, test beds are conducted in extreme environments such as Mt. Everest and remote areas such as the tropical jungles of Ecuador. In partnership with NASA Ames Research Center, NASA Johnson Space Center and the Mars Arctic Research Station (MARS) Society, the Medical Informatics and Technology Applications Consortium (MITAC) developed and deployed several unique telemedicine tools for evaluation in the Arctic Circle at Haughton Crater at Devon Island. Located only 15° from the north pole in Northern Canada, Devon Island offers researchers isolation and a landscape similar to the planet Mars. Two researchers located at Devon Island were outfitted with telemedicine equipment, including personal vital signs monitors — GPS transmitters, a Xybernaut wearable computer, and an array of sensors. This permitted wireless monitoring of the individual researchers as "terranauts." Physicians at the MITAC in Richmond, Virginia monitored the health status of the terranauts both in real-time as well as a through an artificial delay in communications of 22 minutes to emulate the data transmission latency when Mars is farthest from the Earth. This presentation will highlight the work accomplished on Devon Island and implications for home healthcare.

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081 THE POTENTIAL OF VIDEO-TELEPHONE FOR TELEHEALTH

Toshio Ohyanagi, Japan, Masako Miyazaki, Canada, Masanobu Mitani, Japan. Telehealth Technology Research Institute, University of Alberta, Edmonton, Alberta, Canada

Mitsubishi's ISDN-based video-telephone, which supports ITU-T international videoconferencing standards of communication (H.320), video codec (H.261/H.263) and audio codec (G.711 and G.728), demonstrated strong interconnectivity with other Telehealth systems. The video-telephone is also equipped with audio and video input/output ports to connect peripheral devices such as cameras, microphones, speakers and monitors.

There were two objectives for this study:
1. to test interconnectivity of the video-telephone with existing Telehealth systems,
2. to investigate a way of integrating the video-telephone with PC's and/or some other equipment intended for Telehealth use.

During the presentation, we will present ease of video-telephone use, its ability to connect with currently available Telehealth system, and its integration with desktop PC or laptop.

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082 THE OPEN SOURCE MODEL: A STRATEGIC CATALYST FOR TELEHEALTH

Joseph Dal Morin, Minoru Development Corporation, Canada.

The rapid growth of Linux as a production operating system, its adoption by IBM, Hewlett Packard, Compaq and Dell as well as many articles in various trade journals, along with funding initiatives in Europe targeted at Open Source projects, has generated a lot of interest in "Open Source" software. What is all the excitement about? Is this just another fad? The paradigm shift of the Open Source business model and the software it produces has the potential to solve some of the major obstacles to establishing networked systems in healthcare. This session will provide an overview of the Open Source model, the strategic implications of this paradigm shift to healthcare, a review the current open source initiatives in healthcare including the Open Source Health Care Alliance.

Joseph Dal Morin
Minoru Development Corporation, Canada.

083 DEVELOPING A PROVINCIAL TELEHEALTH EVALUATION SYSTEM

Marilynne A. Hebert, Penny Jennett, Trevor Cradduck. Health Telematics Unit, University of Calgary, Alberta we//net, Alberta, Canada

The Health Telematics Unit was contracted by Alberta we//net to develop a provincial telehealth evaluation plan. This plan had four objectives: create a "generic" set of evaluation tools; aggregate data reported provincially; implement an easy to use system; and support decision-making.

Three information sources were used to develop the data collection and reporting tools: evaluation literature; business plans; and participation of three pilot sites. Generic measures for access, quality and costs were determined and data reporting tools converted to ACCESS '97®. The evaluation system was implemented in 7 Health Authorities and one provincial program modified their existing system.

A primary challenge was to identify meaningful data to support local decision-making as well as provincial aggregation. Agreement on data definitions and automating calculations were essential to produce comparable data and reports. An unexpected lag occurred between implementing the system and producing quality reports.

Telehealth evaluation at a provincial level required different approaches than for a pilot study. Future reviews are necessary to ensure ongoing data validity and utility for decision-making.

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084 **AN APPROACH FOR DEVELOPMENT OF COMMON OUTCOME INDICATORS FOR EVALUATION OF TELEHEALTH PROGRAMS**

Richard Scott, Frank McCarthy. Institute for Health Research, Saint John Regional Hospital, Saint John, New Brunswick, Canada.

Telehealth truly represents a global activity that will continue to transcend traditional physical and virtual borders. As such it becomes crucial that evaluation of purported telehealth solutions be conducted in as common a manner as possible, so that all concerned truly understand the capability — and limitations — of each application. The Institute of Medicine evaluation model (1996) has provided a base from which to build. But this, and other proposed models, lack definition of suitable outcome indicators and lack support in broad acceptance and routine implementation.

It is suggested that a four stage process be supported by the telehealth community :

1. Identification of candidate outcome indicators
2. Definition of suitable outcome indicators
3. Consensus building
4. Implementation

Examples from other jurisdictions can guide development of processes for each step.

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085 **ASSESSMENT OF TELECONSULTATIONS IN A NORTHERN HEALTH REGION**

Pam Brockway, Canada, Raymond Howard, Canada, Paul Davis, Canada, David Hailey, Australia, Cameron Donaldson, Canada. Keeweetinok Lakes Regional Health Authority 15, Slave Lake, Alberta.

Context: Keeweetinok Lakes Regional Health Authority 15 (KLRHA), located 300 km Northwest of Edmonton, is geographically large (53,759 km^2), culturally mixed (45% aboriginal) and sparsely populated (26,084), making it ideally suited for Telehealth. Teleconsultations comprise four of the six main applications of Telehealth in KLRHA.
Objective: To evaluate the costs and benefits of Teleconsultations in KLRHA.
Methodology: Data was collected with Client, Physician, and Service Provider Satisfaction questionnaires. Societal costs for two models of providing consultations, the first for Teleconsultations and the second for Patient Travel, were calculated using costing data from satisfaction questionnaires and administration.
Main Findings: In a year, 186 consultations with 117 clients occurred. Key client satisfaction findings are (n=83, 71% return rate); telehealth improves access to health care (85%), 76% prefer telehealth over travelling, 12% wouldn't have had the consultations without Telehealth, care received via telehealth as good as an in-person visit (87%), 95% would use telehealth again. Overall satisfaction with telehealth was 93%. Physicians and Service Providers reported 14% of clients (n=81) required further external referral, 91% of the time they were comfortable making a diagnosis/delivering a service and 100% (n=41) felt the overall quality of the Telehealth sessions was good. Economic analysis indicated that at 804 consultations per year the total costs (fixed and variable) were the same as the client travelling (C$463 per consultation).
Conclusions: Clients, Service Providers and Physicians are satisfied with Telehealth. Teleconsultations incur greater cost than traditional service but the benefits could outweigh the costs at moderate levels of provision.

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086 EVALUATION OF A TELE-DIALYSIS PILOT PROJECT

Jocelyne Picot, L. Heaton, J. Jackson. Infotelmed Communications Inc., Verdun, Québec, Canada.

The evaluation of a tele-dialysis pilot project will be presented. This project involved videoconferencing and other technologies to link:

> (1) hemodialysis patients at home;
> (2) a satellite center in a rural community and;
> (3) the haemodialysis center of a regional hospital to the specialists of a nephrology service located in a hospital a distance of 1 to 3 hours away (by car).

The communications systems were used for distance education, tele-consultations, communications with personnel and patients, and tele-monitoring.

A mix of methodologies were used in a participatory evaluation framework. With project participants acting as advisors, different instruments and techniques were developed to evaluate multiple dimensions of the project. Preliminary results of data collected from self-administered questionnaires, observations, focus groups, and interviews over 4 time periods will be presented. The paper will also discuss challenges due to the small number of subjects involved along with the advantages and disadvantages of the evaluation methods chosen.

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087 THE NOVA SCOTIA TELEHEALTH NETWORK: EVALUATION ACHIEVEMENTS AND QUESTIONS

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Background
The Nova Scotia Telehealth Network (NSTHN) is a province-wide program which has linked all 40 hospitals since March 1999, and hospitals in one region since January, 1998. The purpose of the NSTHN is to increase access to health care services for patients and providers, primarily in rural areas. An extensive evaluation was undertaken from January, 1998 to March, 2000.

Methods
For the six most extensively used educational and clinical applications, we identified evaluation variables and methods for each objective. We also evaluated a number of smaller applications using a shorter format. We collected data using both quantitative and qualitative methods.

Results
Results indicated that:
- rural patient access to health care improved
- rural physicians access to consultation, diagnostics services and continuing education improved
- quality of patient care improved
- telehealth services were satisfactory to patients, providers and referring health professionals
- health care and personal resources were saved

Discussion
Although objective of the NSTHN were met, the evaluation suggested areas for
further study. These include the need for more detailed assessments of how telehealth consultation differs from face-to-face consultation for specific applications, impact of telehealth upon utilization of health care resources and upon health care outcomes as compared to conventional methods, requirements for clinical guidelines for individuals telehealth applications, ect.

088 **TELEHEALTH IN THE NEWFOUNDLAND OFFSHORE PETROLEUM INDUSTRY**

Carl Robbins, Memorial University, Health Sciences Centre, Room 1776,
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The Hibernia Platform located some 300 kilometers southeast of St John's is situated in a particularly hostile part of the North Atlantic. These are frequent poor weather conditions that can cause delays in emergency medical evacuations.

The health service to the approximately 200 persons on board the platform includes a preemployment and periodic fitness appraisal and a sickbay service staffed by a nurse. Since June 1997 when the platform was put in place the health service has relied in part on the use of telehealth technology. Aside from the pager and telephone access to an on-call physician at all times, the consultation system uses high resolution images from an examining camera and otoscope that are transferred via satellite in "store and forward" or live video format for review by the onshore physician. The video link is also used for continuing education purposes.

This presentation outlines the rate and type of illness and injury that occurred over the first two years and the health and education benefit provided by the telehealth link.

089 **MELTING THE MILES; TELEPSYCHIATRIC CONSULTATION TO UNDERSERVICED AREAS**

Elsa Broder, Jeffrey Hawkins. Telepsychiatry Program, University of Toronto, Toronto, Ontario, Canada.

Objective: Canada is a large country and child psychiatrists a very scarce but needed resource. Interactive television on ISDN lines provides a way to meet the need. Five years ago a link was made between Toronto and Parry Sound, a northern community that had not been able to access child psychiatric consultations. To date, 140 consultations and teaching sessions have been done. The difficulties encountered, process of consultation, diagnoses made and recommendations will be presented comparing these parameters to face to face consultations done by the senior author to a Children's Mental Health Centre located just north of Toronto.

Methodology: A retrospective view of the consultation reports was done along with an analysis of data from clinician and client satisfaction scales regarding this form of service delivery. Cost effectiveness was also considered.

Results: Clarification of diagnosis and which medication to use, in what amounts, followed by requests for guidance about management were the most frequent asked questions. Attention Deficit Disorder was the commonest diagnosis followed by V code diagnosis of parent/child relationship problem. These findings were similar to face to face consultations. All the respondents were pleased with the service and preferred it to having to travel long distances for consultation.

Conclusion: Interactive television consultations have proved to be a satisfactory, cost effective and productive method to provide consultation to distant, underserviced areas. The programme has recently been expanded to provide child psychiatric consultation to nine additional sites across Ontario.

090 SECOND MEDICAL OPINION. DO WE NEED IT?

Vojka Gorjup, Anja Jazbec, Borut Gersak, Annette Godler. Medical Center Ljubljiana, Slovenia.

The Second Opinion Project is an international telemedicine consultation network with UCSF as the consultant hospital and has branches in nearly 25 countries. Avoiding an alternative opinion could result in endangering a patient by mistreating him or proceeding with unnecessary surgery.

A second opinion may be obtained on all fields of medicine. Since May 1998 we have had 90 patients obtaining a consultation. A videoconference was organized for 4 patients. The average age was 35. Most common fields of consultation were neurology, neurosurgery, oncology an cardiology. The diagnoses made by the consultant center were mainly the same as the doctors' in Slovenia.

We received some suggestions on diagnostic procedures and some differences in treatment procedures. Main indexes of difference were shown in more aggressive approach towards therapy in USA and limited availability of some procedures in our country. Our experiences have shown that the Second Medical Opinion project is a supportive aid in diagnosing and treating patients with rare and difficult conditions.

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091 TELE-CONSULTATION - AN IMPLEMENTATION PROCESS FOR SUCCESSFUL BUY-IN

Roberta Staveley. Telehealth Resource Group Inc., Calgary, Alberta, Canada.

Tele-consultations generate the promise of addressing the needs for specialists in the rural communities. Patients can access services without having to travel. Physicians have access to peer support. Healthcare workers have access to professional support. It stands to reason that better access to specialists will improve population health.

However, in reality we often see specialists and physicians reluctant to get involved with Telehealth. As medical/legal and reimbursement are issues resolved the resistance remains.

This presentation will take a look at the barriers physicians face when telehealth changes the way they deliver medicine. It will also provide a proven process for addressing these barriers.

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092 TELEHEALTH AND TELELEARNING NETWORKS FOR REMOTE COMMUNITIES AND EMERGENCY MEDICINE: A NEWFOUNDLAND AND LABRADOR PROGRAM

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A consortium of partners including Memorial University, CRC, Telesat, and others are currently conducting two multimedia satellite research projects in Newfoundland and Labrador. Collectively the two projects have a value over $2.5 million, and are largely been funded by the European Space Agency (ESA), an association of 14 European countries that pool their resources to develop advanced technologies and equipment for the European space industry to compete globally. Canada through the Canadian Space Agency (CSA) is an associate member of ESA and therefore benefits from the ESA activities.
GENERAL OBJECTIVE: Currently ESA is funding more than a dozen projects including the two mentioned above to gain a better understanding of interactive multimedia satellite applications. This experience can then be applied to developing successful telehealth and telelearning commercial ventures based on the understanding of bandwidth requirements of applications, systems development, associated costs, and actual community requirements. AIMS: The aims of the two projects are: 1. The Remote Communities Services Telecentre (RCST) enables hospitals to advance health and other services in rural communities. The system allows people in rural areas to have access to the same services and opportunities that those who live in urban centres take for granted. 2. The Integrated Emergency Medicine Network (IEMN) uses satellite technology to connect emergency-rooms (ERs) in nine far-distance hospitals and nursing clinics. It will also connect air and land ambulances en route to the ERs. Projects description The RCST project, underway since late 1998, links Telecenters in Happy Valley-Goose Bay, Forteau, Nain, and Twillingate with St.John's and Ottawa using broadband satellite technology. The project focuses on optimization of health, education, and information services for small business and government agencies in rural communities. Under the project, satellite provides bandwidth for such large bandwidth applications as videoconferencing, high-speed Internet access, and digital imaging. For instance, using the system, a doctor at the telecentre transmit images of a young boy's infected ears to an ear, nose, and throat specialist in St.John's more than 450 kilometres to the east. Examining the images on a monitor, the specialist can diagnose the boy's condition and can either prescribe treatment or request a personal visit. Cardiologist consultation and medical education activities are also being conducted. Telecenters also help students in remote areas earn credits for high school, college, or university courses. Other applications abound. Community groups, like the Tourism Association, can learn tricks of the trade by videoconferencing with other associations; employees of a company can upgrade their skills without going back to school; local committees can use the Internet to research new government programs; and job-seekers can use it to find work. The second ESA-funded project, the IEMN, augments the RCST project. Doctors first use the broadband RCST satellite network to consult with patients and their attending medical personnel. If patients' conditions warrant, doctors can then send them to hospital at a distance by ambulance, even the airborne variety. Outfitted with MSAT voice and data service provided by TMI Communications, these special ambulances allow doctors to monitor vital signs of patients in transit and better prepare for their arrivals. Better preparation means faster treatment, and that expediency can save lives. Connected to a portable telemedicine satellite terminal equipped with broadband and MSAT voice and data services, the Integrated Emergency Medicine Network could also save lives in the event of floods, fires, avalanches, or other disasters. Given the frequency of environmental disasters worldwide, a system that offers victims a better chance of survival stands to have global appeal. The RCST project has wrap up in May 2000, and the IEMN project will be completed approximately one year later. RESULTS: Project RCST: The under-served and remote communities are now adapting to new mode of services at a distance and finding that their health, education, business and government services requirements are being met. These services are readily available compared to the previous mode of services where non-were available or the members of the communities had to travel long distances to receive the services. Project IEMN: This project might be a first of its kind test in Canada; the network is tying in four traditional ambulances and one air ambulance. By outfitting the ambulances with MSAT satellite technology, paramedics can send and receive voice and data, including ECG, blood pressure, and other information. The new system will enable paramedics to prepare emergency-room doctors and nurses about the condition of patients before reaching the medical centre.

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093 DELIVERING CARDIAC REHABILITATION TO PATIENTS IN RURAL CANADA OVER THE INTERNET

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Heart disease is a major cause of morbidity and mortality in Canadians. Cardiac rehabilitation services, an essential component of the management of patients with heart disease include patient education regarding: exercise, lipid management, smoking cessation, blood pressure control, optimization of weight, management of diabetes mellitus, and maximizing psychosocial well-being. Cardiac patients in rural areas of Canada without access to integrated community-based cardiac rehabilitation program were recruited to explore the delivery of cardiac education and support using existing infrastructure over the Internet. 120 patients were randomized to receive unlimited Internet access alone, or unlimited Internet access plus access to the cardiac rehabilitation program for six months.

We will present data on need; feasibility of Internet delivery; utilization of the program; patient and provider acceptance and experience; program development; facilitators and barriers to use; patient outcomes, and lessons learned.

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094 WIRELESS TELEMEDICINE STUDY

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In the rural areas the transportation times of patients is much higher than in urban areas. In order to assist the medical personnel at trauma sites, this preliminary study examines the feasibility of a wireless telemedicine system in rural areas. By using the cellular telephone networks to send on-site images, or even video, the hospitals can better prepare for incoming patients and even assist the medical personnel by consultation during transport.

This study examines how well the current analog cellular network is capable of supporting a digital modem connection with the purpose of sending images from stationary and moving vehicles. Different image sizes and resolutions are tested, from a stationary vehicle as well as a moving one. The result of the study shows how prone to error and loss of signal such a system can be, maintaining the connection, even stationary, can be difficult at best.

The study shows that with suitable resolution and compression, the file size and therefore the transmission time can be kept to a minimum. Since image quality is also of big importance, a compromise between image resolution and quality in relation to transmission time must be made.

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095 COST COMPARISON OF TWO BROAD-BANDWIDTH CARDIAC TELE-CONSULTATION SERVICES

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Specialized cardiac services are provided for the entire province by the New Brunswick Heart Centre (NBHC), located in the south of the province (72,092 sq.km., pop. 738,133). The VITAL (Virtual Interactive Telehealth Assistance Links) program, a private-public partnership, included pre-cardiac catheterisation and post-cardiac surgery assessment, broad bandwidth applications. Prior to VITAL patients incurred costly travel over long distances (frequently during severe inclement weather) for these services.

The evaluation strategy was based on the IOM model. With introduction of VITAL, unnecessary travel for patients and their care givers was eliminated, appropriate treatment plans could be devised in advance, and access to the specialised services of the NBHC was enhanced. Both applications were shown to maintain or improve quality and access, and acceptability was high.

'Cost comparison' analysis (Stensland et al., 1999) was favourable, demonstrating a societal savings of $34.06 — 88.24 per consult. Sensitivity analysis showed both applications were most sensitive to line charges, distance from the specialist, and nursing time, and that savings could be maximised. In the most favourable scenario, the net societal savings were $132.72 — 151.85 per consult with breakeven in less than one year. However, while savings accrued to patients, cost to providers or payors increased.

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096 A COST-MINIMIZATION ANALYSIS OF A REALTIME TELEDERMATOLOGY SERVICE IN NORTHERN NORWAY

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Realtime teledermatology has been a routine service provided by the University Hospital of Tromso to a primary health care centre in Kirkenessince 1989. The cost of the teledermatology service was compared with the costs of three alternative methods of treatment for the patients. The first was a combination of a visiting service and a patient travel to hospital. The second was patient travel to the nearest secondary-care centre. The third was a locally employed dermatologist. At the actual 1998 workload of 375 patients, the total cost of teledermatology was NKr470,780, while the three alternatives cost NKr880,530, NKr1,635,075 and NKr958,660 respectively. Analysis of the unit costs showed that the realtime teledermatology service, including local phototherapy, was less costly than the three alternatives for annual workload above 195 patients per year.

097 COSTS AND POTENTIAL BENEFITS OF HEALTH TELEMATIC APPLICATIONS - A "DELPHI" APPROACH

Markus Lindlar. University of Cologne, Germany.

A review of telematic and robotic application studies published on MedLine database in the last 3 years was performed. A panel of health economists estimated the future costs of the interventions in comparison to current standard treatment. To find out more about the potential benefits of each application we performed a consensus finding study based on the DELPHI-method.

We presented each study in a PowerPoint presentation to 5 different raters who assessed the expected benefits of the interventions on a scale from 1 to 9 points. We presented the medium ratings and the range of estimated benefit in a second round to the experts with the possibility to correct their opinion.

The results will be presented and furthermore we will invite the congress participants as international experts in telemedicine to participate in a second Internet-based DELPHI approach based on the same data to gain some understanding on international differences and differences between clinicians and telemedicine experts in estimating the benefits and costs of future telematic applications.

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098 TELEHEALTH COST-BENEFIT EVALUATION: POLICY AND DECISION MAKERS

Penny Jennett, University of Calgary, Health Sciences Centre, Calgary, Alberta, David Hailey, AHFMR- Canada.

Decision-makers at all six policy levels (encounter, program, organization/facility, regional, provincial and national) make decisions specific to telehealth implementation and sustainability. Therefore, decision-makers responsible and accountable for telehealth services need guidelines, tools, and frameworks.

Purpose: This presentation provides telehealth cost-benefit frameworks and tools considered relevant for decision-makers at strategic levels.

Methods: A number of telehealth related cost-benefit components are discussed:
(i) questions for decision-makers;
(ii) data elements for a telehealth business case;
(iii) evaluation approaches;
(iv) strengths and limitations of available elements/approaches.

Discussion: Cost-benefit data and information are of critical importance as telehealth applications are implemented across Canada and the world. A slumber of strengths and limitations of current guidelines, frameworks and approaches for decision-makers exist. Specific enablers described in this presentation can help move policy making, cost-benefit areas forward.

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099 **ECONOMIC POTENTIAL OF IP-BASED REALTIME TELEDERMATOLOGY IN NORTHERN NORWAY**

Elin Breivik. National Centre of Telemedicine, Tromso, Norway.

The establishment of a network linking the GPs in all municipalities in northern Norway and the specialists in all hospitals in the region is in progress. This network enables a IP-based video conference link and thus the patient can have a specialist consultation in the GP's office.

The objective of this analysis was to assess the cost-effectiveness of providing teledermatology to the GPs in the municipalities in northern Norway by means of this network. Telemedicine is an alternative to conventional dermatological care, where the patient travels to the hospital for a specialist consultation. 41 of a total of 89 municipalities were excluded from the study. In these communities there already exists a local dermatology service.

The variables considered in this cost-minimization analysis were investment costs, travel costs and annual workload. The costs considered were those falling on the public health service.

This study showed that realtime teledermatology is cost-effective in 20 municipalities of a total of 48 analysed municipalities in Northern Norway.

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101 **INNOVATION IN TELE-PARAMEDIC SERVICE**

Masako Miyazaki, Lloyd Osler, Dave Dutchak. Telehealth Technology Research Institute, Edmonton, Alberta, Canada.

MD Ambulance in Saskatoon is equipped with mobile computers that enable them to receive accurate dispatch and routing information using MD's leading edge, internally developed computer assisted dispatch (CAD) system. The ambulances have telecommunications linkages with MD headquarters and hospitals to enable the emergency response team to work together from the moment the call is received until the patient is delivered safely at the hospital.

These mobile computers are equipped with specialized software supplied by ROAM I.T.™ that links with the CAD system and automate the preparation of patient care reports. This will help ensure that accurate, consistent information is provided to hospital emergency department staff on a timely basis to assist them to treat patients as quickly as possible upon arrival at the hospital.

This proof of concept project was directed by the Telehealth Technology Research Institute at the University of Alberta and funded by Western Economic Diversification, Industry Canada. The project partners were MD Ambulance, Saskatoon District Health, Saskatchewan Health, SaskTel., and ROAM I.T.™.

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102 INTEGRATED EMERGENCY MEDICINE NETWORK (IEMN)

Patricia Dwyer R.N., Application Coordinator, Collaborative Network Technologies in association with MUN Telemedicine/TETRA

The provision of emergency medical services in rural and remote communities differs greatly from service delivery in urban areas. Urban areas usually can provide access to well-equipped medical facilities staffed with a number of medical specialties, usually within a short distance from the patient, and emergency services can be provided quite quickly. In many rural and remote communities the situation is reversed, with limited access to the resources needed to deal with medical emergency situations and treatment time lengthened by the need to transfer the patient to a better equipped hospital facility. The IEMN objective will see the implementation of a multi-tier emergency medicine network based upon the current health care infrastructure in selected communities in Newfoundland and Labrador that could serve as the basis for a province wide emergency network. The discussion will give an overview of the project and expand upon the objective for implementation

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103 EMERGENCY INTEGRATED MEDICINE NETWORK (IEMN)

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The application focus within the IEMN will be on the provision of real-time communications between patient care teams at the emergency site and the appropriate emergency physicians and resources throughout the network. These communications will be based on a general teleconsultation model, though the teleconsultation process and the underlying network technology will be modeled to support a series of standard utilization scenarios. The standard utilization scenarios to be supported and validated within the IEMN (such as: single point consultation, multi point consultation, patient transport [air & road] support) will be discussed.

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104 ONTARIO CRITICALL PROGRAM THE ONE-NUMBER-TO-CALL REFERRAL SERVICE FOR PHYSICIANS

Trish Simmons, Shelley Moneta. Ontario CritiCall Program, Hamilton, Ontario, Canada.

The Ontario CritiCall Program is the one-number-to-call, 24-hour-a-day referral service for physicians caring for seriously ill patients in Ontario. Its mandate is to assist physicians in smaller communities to access resources of larger tertiary care hospitals in their regions.

Successfully managing emergency patient referrals requires call takers to have immediate access to accurate bed and resource availability for each participating hospital, as well as physician contact numbers for those on-call for each of 50 medical specialties. To manage this information, CritiCall pioneered the development of the encrypted, internet-based **Ontario Central Bed and Resource Registry.**

The Ontario CritiCall Program has demonstrated success as a key provincial resource:

*   More efficient and effective resource utilization of all levels of care
*   Promotes health care accessibility to a greater number of people at less overall cost
*   Offers physicians a more efficient use of their time
*   Allows government to increase the efficiency of the health care network
*   Provides enhanced disaster planning capabilities
*   Enhanced ambulance and emergency communications services
*   Improves communication within each hospital; providing real time information about resources available within hospitals, within regions and within Ontario

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105 CREATING FREE SOFTWARE FOR TELEMEDICINE IN DEVELOPING COUNTRIES

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Context. In sub-Saharan Africa, 14 countries do not have a single radiologist. However Internet connections are now available in all 54 African countries. Studies have shown that adequate quality x-ray digitization can be achieved by 1 – 2 mega pixel digital still cameras[1].
Methodology. We have developed software to assist physicians to make telemedicine and teleradiology referrals by email. The software is written in Java for cross platform capability and will be free under the GNU public license. It provides structured forms to encourage complete case reporting, tailored for radiology, pathology or dermatology. Images are imported into the program and can be cropped and annotated. An HTML page describing the case is generated, then files are compressed (JPEG or Wavelet encoding), zipped and optionally encrypted.
Findings and Conclusions. The system is easier to use than the conventional combination of email, Web editing and graphic programs. It provides better security and image compression, and runs on multiple platforms including Linux. The software can be used and modified freely or incorporated in other systems. We are developing interfaces to electronic medical record systems and Web based image decompression and viewing software.

1. Corr P, Couper I, Beningfield S, Mars M. A simple telemedicine system using a digital camera. Journal of Telemedicine and Telecare 2000;6:233-236.

106 VIRTUAL PRESENCE AT FACULTY HOSPITAL IN SLOVAKIA

Lois Lynch. Women & Infants Hospital, Providence Rhode Island, USA.

Virtual presence through education, training and consultation, Women & Infants' improved clinical outcomes, increased cost efficiency and promoted continuous quality improvement at Faculty Hospital in Slovakia.

Consultations in obstetrics increased prevention of infection and developed high-risk pregnancy protocols and improved the regionalizatioin of perinatal care. In gynecology new protocols for pap smears and increased capacity for "reading" cytology specimens have been developed.

In neonatal care, the perinatal mortality rate declined from 19.1% to 5.1% and the neonatal mortality rate declined from 24.2% to 7.1%. A hospital-wide infection control committee was established.

Improvements have led to a reduction in patient length of stay and in the special care nursery, antibiotic costs have been reduced by almost two thirds. The acknowledgment of child abuse and domestic violence as social issues was ground breaking with our partnership being the first in the country to address these painful issues.

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107 TELEMEDICINE'S NEXT GENERATION - MEDICAL MANAGEMENT

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Hospitals and physicians/physician groups want to optimize their utilization of radiology and other testing. This is especially true in capitated markets. Medical Management can reduce unnecessary testing and increase the use of more valuable tests. This will provide physicians with better toolsfor diagnosis and will likely reduce the overall number of tests requiredfor a particular patient. Mitra will discuss its involvement in connectingthe primary care physicians to the required hospital services in an integrated delivery network.

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108 A STANDARDISED TELETRIAGE ASSESSMENT PROGRAM (C-Triage) FOR REMOTE REFERRAL OF PATIENTS TO A HEART CENTRE USING A SECURE PROVINCE-WIDE NETWORK

Richard Scott, Robert Macdonald, Krisan Palmer, David Garnett, et al. Institute for Health Research and Atlantic Health Sciences Corporation, Saint John Regional Hospital, Saint John, New Brunswick, Canada

Specialised cardiac services are provided only by the New Brunswick Heart Centre (NBHC), in the south of the province (72,092 sq.km., pop. 738,133). Before teletriage the assessment process was subjective, performed by multiple evaluators, and lacked detailed and consistent clinical data, leading to real or perceived inequities in access. A computer-based, standardised, teletriage assessment tool (C-Triage) was designed, implemented, and evaluated through a private — public partnership between Atlantic Health Sciences Corporation and NBTel interActive.

A 'minimum clinical data set' was developed and transformed into a software tool. A client-server model, between seven (7) provincial referring hospitals and the NBHC, uses a province-wide secure 'Wellness Network'. Referring sites have direct access to a database located at NBHC. The patient file is developed by completing mandatory fields (access is restricted to the originating site and the NBHC).

C-Triage is now the provincial standard. It allows collection of pertinent clinical information, and makes it accessible to both referring and consulting clinicians. This has eliminated previous data excesses, simplified ready access to key data, and permitted improved patient management.

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109 CHILDREN'S TELEHEALTH NETWORK: SUCCESSFUL INTEGRATION AND IMPLEMENTATION OF TELEHEALTH — THE FREDERICTON EXPERIENCE

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The Children's Telehealth Network (CTN) is an inter-provincial network that provides support to children, women, families and health care providers. CTN is an initiative of the IWK Grace Health Centre in collaboration with health-care centres in the Maritimes, TecKnowledge Healthcare Systems Inc., and telecommunications providers. The network was established in March 1996 and was the first program of its kind in Canada.

In February 2000, CTN was expanded to include the Dr. Everett Chalmers Regional Hospital in Fredericton, New Brunswick. A unique implementation methodology was applied that included project management, needs assessment, telehealth service design, policy development, training, and clinical validation. The process involved administrators, health records, risk management, pediatricians, child life, nursing, information management, clinical engineering, patient registration, radiology, and education/multi-media. Benefits realized include improved timeliness in the management of care, decreased time from school and work for children and families, enhanced transition planning between facilities and home, the support of quality care, and ongoing education.

A post-implementation review was held to determine factors that contributed to the success of the project. Key elements identified include:

(1) Tele-Health experience and an understanding of the benefits;
(2) Clearly identified needs;
(3) Open and consistent communication;
(4) Appropriate organizational support and structure;
(5) Collaborative planning;
(6) Policy development and:
(7) Training.

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110 CHALLENGE: IMPLEMENTING TELEHEALTH SOLUTION: A SELF-DIRECTED TELEHEALTH LEARNING GUIDE

Chris-Anne Ingram, IWK Grace Health Centre for Children, Women, and Families, Halifax, Nova Scotia, Canada.

Since 1996, the Children's TeleHealth Network™ (CTN) has enabled health care professionals at the IWK Grace Health Centre to provide specialty pediatric and women's health care services to patients throughout the Maritime provinces via telehealth.

Guidelines and policies for health care delivery have evolved and developed over the years. With this, educating health care providers and support staff on the process of implementing telehealth practice into their delivery of care has become an important challenge.

After consultation with colleagues it was determined that a self-directed learning package on telehealth would be a solution to this time consuming challenge. The Self-Directed TeleHealth Guide includes information that is used as an introduction to telehealth and includes the details of telehealth policies and guidelines that the IWK Grace has adopted to implement this unique telehealth network.

The session will highlight the content of this guide that has enabled clinical services to integrate telehealth consultations into their practice as well as provide feedback from colleagues and partners who have used this guide.

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111 BUSINESS CASE ANALYSIS IN TELEHEALTH

Dorothy Spence, Linda Weaver. TecKnowledge Healthcare Systems Inc., Dartmouth, Nova Scotia, Canada.

Business process modeling techniques have been successfully used to ensure telehealth solutions truly meet user needs. The modeling process identifies and defines the components of telehealth delivery - people, resources, technologies, global standards, processes, communications and organizational structures. Models are then refined with details from known data, regulatory and professional requirements, and time related factors. Modeling is most effective when conducted with "content" experts, government and professional representatives, and those knowledgeable on telehealth technologies and solutions.

Our work on a number of models has resulted in the development of the following critical success factors:

1. **Standards** for both telehealth technology and telecommunications based on, clinical practice requirements, cost efficient use of technologies, and sites and services that are technically interoperable (regardless of vendor), and interconnectable (regardless of communications media).
2. **Clinical confidence** in telehealth technologies, including diagnostic quality images (x-ray, colour picture and video), quality sound (stethoscope), and true representation of paper-based information (eg: lab reports).
3. **Support** at all telehealth sites, including administrative, technical, clinical, and administrative support.
4. **Scheduling** for telehealth equipment and services that evolves from the traditional "manual" process to coordinated and automated process as the network grows.
5. **Facilitated information flow,** both clinical and administrative, to support the clinical consultation process.

Creating a visual description of the telehealth service clarifies many of the underlying issues that face telehealth practitioners. Critical success factors are addressed by creating a functional, technology and organizational framework upon which successful telehealth services can be built, by integrating the capabilities of technologies, organizations and people.

112 **EFFECTIVENESS OF TELELEARNING FOR COMMUNITY NURSES IN REMOTE AREAS**

Dr. Marilynne Hebert & Ms. Janet Helmer

The Victorian Order of Nurses (VON) provides community-based care, professional health and related volunteer support services across the country. Health care providers in remote or isolated communities often experience professional isolation. As well, travel time and cost factors prohibit their attendance at workshops to maintain competence and professional accreditation. As the population ages there is an increased need for service providers to keep knowledge and clinical skills current in these related areas, particularly around the management of chronic diseases. Continuing education
that is both cost efficient and effective is required. This study will investigate the appropriateness of a telelearning strategy for the VON through comparison of a web-based delivery mode to traditional classroom instruction. Both will include evaluating clinical skill demonstration.

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113 **TELE-HOMECARE: HOW DOES THE MODEL APPLY ACROSS CANADA**

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Background:
Integrated clinical services, supported by video-conferencing and remote vital signs monitoring, provide an opportunity to deliver homecare efficiently. This has the potential to service those whose needs cannot be fully met by the current community care system (e.g., those who live in rural or remote areas or who require monitoring several times per day). The concept of frequent care delivery is currently being tested in a trial at the Hospital for Sick Children in Toronto.
Objective:
This study sought to determine the generalizability of Tele-HomeCare (THC) for children across Canada.
Methods:
Three sites were identified to represent the diversity of the Canadian health care delivery system: Toronto, Calgary and St. John's (Newfoundland). Theoretical models of THC were developed in consultation with providers in these regions. The models were then compared on several parameters: the target population, the intensity of care, scope of monitoring, location of monitoring centre and peripheral sites, hours of service, communication technology, etc.
Results:
Three models of THC for children were generated. The models differed in the target population, frequency of care and hours of service. They were similar in viewing this as a mechanism to further integrate community and hospital-based services, that would better support families in the community. Details of the models will be presented and discussed.

114 PAEDIATRIC TELE-HOMECARE: A COLLABORATIVE PARTNERSHIP FOR CHILDREN WITH INTERMEDIATE INTENSITY HEALTH CARE NEEDS

Johanne Carbonneau, Lesley Collins. The Hospital for Sick Children, Toronto, Ontario, Canada.

The Tele-HomeCare Project at the Hospital for Sick Children utilizes a collaborative partnership between the family, the hospital and the community to meet the health care needs of children who do not fit the typical criteria for sustained hospitalization and are not appropriate for current community services.

The use of video technology and information systems provide the communication pathways which support the collaborative partnership to create a hospital without walls.

We report on the benefits and challenges of using video technology and physiological monitoring interfaced with an electronic patient data management system to safely support the transition home of a four year old child post cardiac surgery.

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115 HOSPITAL MANAGED CARE OF CHILDREN IN THEIR HOMES

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Astrid Lindgren Children's Hospital, Karolinska Hospital, Stockholm, Sweden.

In 1996, at the Astrid Lindgren Children's Hospital, part of the Karolinska Hospital in Stockholm, Sweden, a project was started with the objective to provide hospital quality care to patients in their homes supported by a hospital managed advanced team of paediatricians and specialised medical staff assisted by modern technology and management utilities. The care of patients is managed from a control center which co-ordinates the activities of the mobile teams in relation to patients/parents and hospital wards. The mobile teams are equipped with mobile phones, mobile computers and cars. During 1999, 350 patients stayed 3000 bed days in their homes instead of in a hospital bed. A video is available to demonstrate the project.

An external project audit (May 2000) concluded: the concept is successful and cost effective. The quality compares to care provided in a hospital bed. Patients/parents acceptance is very high. The concept is recommended as applicable to other areas of health care. According to the audit the cost per bed day is reduced by more than 30% implying cost savings of USD 1-2 million per year at present level of activity.

Development activities within the project: Advanced communication equipment and software for monitoring and interacting with patients in their homes from the control center is currently under development. A project within the European Commission 5th Framework Program, The TelemediCare, focuses on development of wireless micro sensors for continuous patient status monitoring. Digital camera pictures are transmitted to the control center, and in the future interactive mobile video consultations will be an option. A mobile computer-based system for planning and documentation of medical and nursing care is under development. An interactive database has been developed for registration of patients, medical activities, staff involvement, use of resources and time spent on various assignments. Extensive research and development has been devoted to obtain a model for planning of resources and logistics, where even advanced computerised simulation and optimising tools are used. For enhanced logistic planning purposes a geographic information system is being tested to indicate the location of patients related to transportation resources and available staff.

116 CLINICAL EVALUATION OF HOME ASTHMA TELEMONITORING

Joseph Finkelstein, George O'Connor, Robert H. Friedman. Boston University, Boston, MA, USA.

Asthma patient self-care plans have become the standard of care in asthma. However, the value of asthma self-management has been questioned because of patient non-compliance with self-care plans is common. The goal of the project is to demonstrate that Home Asthma Telemonitoring (HAT) can lead to improved patient compliance with self-care plans. Patients using HAT have an electronic flowmeter and a palmtop computer in their home which links by telephone connection to a Web-based asthma information system. Patients are instructed to use the system daily by first obtaining a maximum PEF measurement using the flowmeter and by answering questions on the palmtop about their asthma symptoms, medication use, and other asthma self-care actions. This data is automatically transmitted to the HAT information system where it is evaluated, and patients are automatically given feedback responses on their palmtop about their asthma status and messages designed to improve their compliance to their self-care plans. An asthma nurse case manager also is notified by HAT if patients do not follow their self-care plans or clinically significant conditions occur. This allows the nurse to contact those patients in a timely manner to reinforce self-management skills or to respond to an exacerbation, and if necessary, to involve the patients' physicians. In a randomized study we compared adult asthma patients who used HAT with those who did not. Our data showed a positive impact of HAT on patient compliance and other clinical outcomes.

117 TELEHOMECARE RESEARCH OUTCOMES FROM KAISER MANAGED CARE HEALTH SYSTEM: EFFECTS OF REMOTE TECHNOLOGIES ON ACCESS, QUALITY, COSTS AND PATIENT SATISFACTION

Barbara Johnston. Kaiser Permanente, Sacramento, California, USA.

The Kaiser TeleHomecare Research study was designed to evaluate:
1. Improved access to home care patients in rural and urban environments;
2. Maintenance of high quality home healthcare;
3. Technology to be affective and user friendly;
4. Patient and Provider satisfaction using remote monitoring systems.

TeleHomecare has been described as a solution to improve access home healthcare in both rural and urban environments, decrease costs of care and also to increase nursing productivity in home healthcare.

This study was constructed on a research design to provide the data necessary to validate these theories. The results of this study and two case studies will be presented which support positive outcomes for TeleHomecare.

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118 SYNCHRONOUS TELEMEDICINE APPLICATIONS FOR CHILD ABUSE EVALUATIONS

Jay Morris Whitworth. University of Florida, Florida Child Protection Teams, Dept of Health/CMS, Jacksonville, Florida, USA.

For the past eighteen months the Florida Child Protection Team Program has been using telemedicine links to provide real time evaluations of allegations of abuse in rural hospitals surrounding a referral center. This presentation will review our experience with equipment, signal transmission, patient acceptance, and legal sufficiency of our system. Photographs and videoclips will demonstrate the clinical application of the technology. Uses of the network for consultation and training of existing teams will be summarized. We will also encapsulate our plans to expand the system into a statewide network.

119 TECHNICAL EVALUATION AND OPTIMIZATION OF A CONVENTIONAL TELERADIOLOGY SYSTEM

Renald Lemieux, Guy Bisson, Christian Blais, Jean-Marie Moutquin. GRITES, CRC-CHUS, Sherbrooke, Québec, Canada.

One application of Teleradiology is to send digitized X-ray films to radiologists for diagnosis. In this setting, our goals were:

1) to evaluate the quality of the technology used and set standards for image acquisition,
2) to improve the quality of digitized images to tend to reach the quality of original films using image processing techniques.

Results:

1) 12 bit-digitization did not improve significantly image quality compared to 8 bit-digitization.
2) Images processed during digitization (pre-processing) were superior to digital images without any processing.
3) Processed images after digitization (post-processing) were superior to pre-processed images.
4) Gamma curves specific to category of images (lungs, bone, etc.) must be applied to adequately improve image quality for diagnostic purpose.

Conclusion:

Our study shows that image acquisition and optimization protocols must be specifically developed based on the characteristics of each category of images.

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120 THE TELEHEALTH SCHOLARLY PROGRAM, FACULTY OF MEDICINE, UNIVERSITY OF CALGARY

Penny Jennett. University of Calgary, Health Science Center, Calgary, Alberta, Canada.

This poster profiles the Telehealth Scholarship and Training Program whose mandate is to conduct applied, globally competitive, collaborative telehealth research; provide leadership/consultation on the utility/sustainability of telehealth applications; create a critical mass of world-class researchers; and offer graduate training in telehealth.

The Program's multidisciplinary/multi-sectoral partners; current international, provincial, and local activities; recruitment goals and special events; graduate program opportunities; and turnkey facility will be highlighted. Multi-disciplinary team members have established partnerships within the academic/professional/public/and private sectors at provincial/national/international levels. Active recruitment of researchers for the Program is in progress. The first Ph.D. student and post-doc are in training. The Program organized the first Telehealth Research Summer Institute 2000. The Telehealth Scholarly Program — with its applied research and training components, cross-sectoral partnerships, and state-of-the-art facility — is unique in Canada.

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121 COOPERATIVE INTERNET-BASED TELEMEDICINE SYSTEM

Mohammad Hameed Al-Taei. Zarka Private University, Zarka, Jordan.

The combination of Internet with the health services providers creates the concept of Internet telemedicine (web telemedicine), which as the media where telemedicine is available, using all the techniques, advantages, tools and facilities of the Internet.

This paper has been written to show the role and importance of Internet technology in the Telemedicine application. The main idea in this paper is to design and describe a proposed cooperative Telemedicine system through Internet hospital. The needs, component, function and hardware requirements of this hospital were described. Theoretical discussion about telediagnosis application system that can be used in this hospital also mentioned.

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122 DEVELOPMENT OF AN IMAGE ANALYSIS SOFTWARE TO ASSIST IN THE DIAGNOSTIC OF DIABETIC RETINOPATHY

Langis Gagnon, M.-C. Boucher. Centre de recherche informatique de Montréal; Hôpital Maisonneuve-Rosemont, Montréal, Québec, Canada.

We present recent results regarding the research, development and integration of automatic image analysis tools for the detection and characterisation of diabetic retinopathy (DR) in low-resolution color fundus images obtained from a non-mydriatic camera.

The system, called RETSOFT, is aimed at helping the screening of DR by assisting the ophthalmologists in their diagnostic tasks, or by transferring a medical report to a specialised clinical centre for a complete diagnostic assessment.

An important R&D effort is put on the design of practical image analysis algorithms for the detection of the anatomical structures and lesions, as well as on the ergonomic aspects of the software interface according to specifications raised by medical users. System's functionalities include automatic image quality assessment, detection of retinal network, macula and optic disk, detection of micros-aneurysms, exudates and neo-vesels as well as electronic patient file annotations.

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123 PRACTITIONER-INITIATED ADVICE TO PATIENTS THROUGH ELECTRONIC MODES

Wendy L. Schneider. Alberta Heritage Foundation for Medical Research, Edmonton, Alberta, Canada.

The study's objective is to provide evidence on the efficacy and effectiveness of PIA provided to chronically ill patients via electronic modes, compared with face-to-face office visits. Frequent contact via electronic means with these patients may be advantageous by identifying early deterioration in health and making timely and important adjustments in treatment.

Medical databases such as MEDLINE, PreMEDLINE, PubMed, HealthSTAR, Best Evidence, EMBASE, Cochrane Library and CINAHL were searched using single and combination MeSH terms. Three RCTs, a review and a technology assessment met the inclusion criteria.

Comparative results were equivalent whether patient advice was provided by a face-to-face visit or by telephone or by electronic mail. However, there is a need for longer-term studies, local input on validation and future determination of economic factors. The available data are inconclusive. There is a need to define where electronic contact is appropriate with each patient contact strategy requiring validation.

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124 INTERCONNECTIVITY CHALLENGES ASSOCIATED WITH TELEHEALTH

Masako Miyazaki, Canada, Toshio Ohyanagi, Japan, Steve Sutphen, Canada, Dan Reinbold, Canada, Wayne Lamoureux, Canada, Clayton Knoll, Canada, Anne Walley, Canada, Kari Pau, Canada.

In Canada, low population density and a large landmass present many challenges for health care providers and patients alike. Telehealth can be a practical solution for some situations. Successful implementation of Telehealth will rely on the following:

1. Skill sets and user's problem solving attitude,
2. Reliable and economical power supply,
3. Steady and economical power supply,
4. Economical and stable telecommunication network.

In principle, we should be able to connect seamlessly. But in reality, there are numerous challenges associated with interconnecting the variety of telecommunication networks such as: fiber optics, Internet, ISDN, Ku-band satellite, C-band satellite, microwave, cable and direct TV. In order to support telehealth service, it is essential to support users. Otherwise, it is not difficult to lose their support for telehealth.

This presentation will focus on challenges associated with interconnecting the use of variety of telecommunication networks for telehealth in Canada.

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125 PROBLEM-BASED, SMALL-GROUP CONTINUING MEDICAL EDUCATION BY VIDEOCONFERENCE

Michael Allen, Joan Sargeant, Karen Mann, Michael Fleming, John Premi. Dalhousie University, Nova Scotia, Canada

Introduction: Problem-based, small-group learning is a well established method of providing continuing medical education. In this method, a physician-facilitator guides a group of 8 to 10 physicians through a workbook consisting of background material, case presentations and questions for discussion. Each module takes 1 to 1-1/2 hours. However many communities contain too few physicians to form an effective group. The purpose of this project was to assess the feasibility, acceptability and effectiveness of conducting problem-based small-group modules by videoconference.

Methods: We linked physicians in 3 Nova Scotian communities by videoconference at 384 Kbps. From a fourth videoconferencing site in Halifax, a trained facilitator guided learners through 4 problem-based learning modules. We collected data through observation, questionnaires, focus group, interview and pre- and post-test of knowledge.

Results: Technical problems sometimes prevented the sessions from starting on time. The facilitator found it slightly more difficult to moderate discussion by videoconference than in a face-to-face group. Generally, participants found that videoconferencing did not hinder discussion. Overall, it is feasible to conduct problem-based, small-group learning by videoconference though it is essential to pay close attention to camera and microphone positioning.

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126 TELE-SPORTS MEDICINE PROJECT BETWEEN JAPAN AND CANADA

Toshio Ohyanagi, Japan, Masako Miyazaki, Canada, Steve Sutphen, Canada, Masaki Katayose, Japan, Masanobu Mitani, Japan, Osamu Miyagishi, Japan, Tsuyoshi Yamamoto, Japan. Telehealth Technology Research Institute, University of Alberta, Edmonton, Alberta, Canada.

Tele-sports medicine project was conducted between Japan and Canada from January to April 2000. We used a) Japan Gigabit Network; b) GEMnet of NTT; c) CA*net of CANARIE as our research backbone. The connection was the first of its kind among these networks. IP-based videoconferencing and custom-developed collaboration software were employed and tested extensively throughout the duration of the connection. This system enabled Japanese trainers and therapists staying in Sapporo to communicate with Japanese speed skaters training at the Olympic Oval in Calgary. It was the first time trainers and therapists have been able to conduct sophisticated, real-time performance analysis and diagnosis of their athletes abroad.

There were several objectives for this project;
1. to use broadband IP-based videoconferencing for Tele-sports medicine,
2. to remotely control a PC in Oval from the TTRI in Edmonton to monitor the motion analysis between Calgary and Sapporo,
3. to remotely diagnose athletic injury using high-speed motion camera and collaboration software,
4. to provide rehabilitation treatment via the network.

Through this project, we were able to prove that;
1. The research networks are invaluable for Telehealth researchers,
2. Tele-sports medicine is an economical way to support Olympic level athletes to benefit from full-scale coaching and treatment support from their own country.

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127 CLINICAL CHALLENGES ASSOCIATED WITH TELEREHABILITATION

Masako Miyazaki, Telehealth Technology Research Institute, University of Alberta, Edmonton, Alberta, Canada.

Telerehabilitation is a collective term for Tele-Occupational Therapy, Tele-Physical therapy and Tele-Speech Pathology & Audio logy. Since 1996, there have been an increasing number of publications associated with Telerehabilitation. However, many of clinical documentations are limited to survey of therapists and clients who were involved in Telerehabilitation trials or anecdotal reporting of clinical experience.

In order to make the Telerehabilitation data portable, it is essential to address the technological issues associated with the following aspects;

1.   Assessment,
2.   Treatment,
3.   Follow-up,
4.   Supervision of support personnel.

Each aspect will require careful activity analysis to optimize the use of Telehealth technologies. For example, we may perceive an improvement in client's joint range of motion due to a camera angle. For some clients, it may be essential to sync voice and motion. There may be an issue associated with a reversal of right and left on the screen.

This presentation will address the needs for standardization of Telerehabilitation and to present a framework for this process.

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