

A Telehealth Report

5th Annual Conference of the Canadian Society of Telehealth

e-HealthCare: What Constitutes Return on Investment?

Vancouver, October 3-5, 2002

Prepared by
Canadian Society of Telehealth
for
CANARIE Inc.

R.E. Scott
Editor

January 2003

Contents of this Report

This report of the 5th Annual Canadian Society of Telehealth conference – “e-HealthCare: What Constitutes Return on Investment?” presents the discussions and exchanges of experience and information that took place at the conference, as well as editorial comment and recommendations. In accordance with the focus of CANARIE Inc. emphasis has been placed on those presentations that address issues of particular relevance to the telehealth industry within Canada. This focus is seen in the ‘overview’ segment that precedes presentation of each panel or concurrent session. Similar to other reports of CST conferences, it is intended that this document serve as a valuable *aide-mémoire*. It has been developed from available reports of conference rapporteurs and presentations, and reviewed by select members of the CST Board.

The first section of the report describes the conference and its objectives. The second section contains summaries of the Keynote Presentations, section three summarises each Panel Discussion, and section four contains summaries of the Concurrent Presentations made at the conference.

The conference took place October 3-5, 2002 at the Sheraton Vancouver Wall Centre Hotel, Vancouver, Canada and was supported by several agencies and companies whose contributions as sponsors or exhibitors are gratefully acknowledged.

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* indicates 2 sessions for each topic

Editorial Comments

The utility of telehealth – or increasingly e-health – has been proven in many settings. However, the economic viability of e-health solutions remains in question. CST 2002 - “*e-HealthCare: What Constitutes Return on Investment?*” - was a timely meeting, bringing the focus of thought towards that crucial question. The conference addressed this issue by examining what 'value' e-health has for its varied stakeholders and how it differs amongst them. Clinical, academic, industry and government delegates responded to the question through a varied program, which included pre-conference workshops, plenary presentations, panel discussions, concurrent sessions, and breakfast roundtables.

Conferences provide the valuable opportunity for 'f2f' networking. But this meeting was also notable for use of the very technology promoted by e-health users. Several presentations in the panel sessions were presented via video-conferencing technology, and provided a flawless demonstration of worldwide, interactive communication from northern Canada to southern Australia. Formal feedback from the conference evaluation showed it to be very successful, with many positive comments from the industry sector and other attendees. Interest in the conference was high, with 121 abstracts submitted for consideration. The peer review process resulted in selection of 104 of these abstracts, presented as 72 proffered presentations and 32 proffered posters. Topic areas were: Clinical Care and Disease Management, Outcomes and Evaluation, Sustainability and Integration, Policy, Return on Investment (ROI), Telehomecare, e-Learning, and Technology Development. Two sessions were provided for each of the first five topics. In addition current knowledge and perspective on topical issues was presented by national and international speakers in 2 plenary presentations and 17 panel presentations. Over 330 delegates attended or presented at the conference, including many colleagues from abroad, and those from the public, private, professional and academic sectors.

Conversations indicated that with the telecom downturn and lack of expected telehealth adoption and integration, times have been tough for the industry sector and awkward for the public sector. Keynote presentations provided some needed perspective at this critical time, but the perspective provided was both welcome and disquieting. Linda Lizotte-McPherson described the recent creation of the Canada Health Infoway Inc. and clearly laid out its single focus on the Electronic Health Record (EHR). Those in the field of telehealth welcomed this development, since the EHR represents a critical component that will contribute to a functional e-health environment. Indeed this was identified at the CST's 2002 Conference in the panel “Integrating Health Informatics and Telehealth” that focused on the means to ensure these two crucial and complementary components are brought into alignment. However, at the same time this news was disquieting, particularly in the wake of the recent extensive changes within OHIH. CHIH has been said to hold the mandate to promote both telehealth and telematics, and evidence of support of this dual mandate would be welcome. Telehealth and the EHR are kindred spirits that work in synergy; either advanced at the demise of the other will prove ineffectual at best. Robert Webster also provided perspective on the need and value of broadband. The multi-media functionality provided through broadband is clear, and others have suggested that global communications companies have increased their debt by \$400 billion to install broadband technology that is 97% under-utilised. This capacity is waiting

for e-health applications, and we must find ways to make access both cost effective and content effective. It was emphasised that costs for broadband are decreasing, which will increase the feasibility of this technology being embraced by the already financially constrained healthcare sector. There was no doubt left in the minds of attendees that broadband will play a crucial role in providing ubiquitous access to e-health solutions.

Although the focus of the conference, a review of the proffered presentations and posters showed that we still lack a clear understanding of what constitutes return on investment. So - just what is Return on Investment? An ROI model originally developed by DuPont is now in worldwide use. The model shows how businesses generate profit and how well a company uses assets to generate sales. It is a fast, convenient financial measure that helps executives understand the relationships among profit, sales, and total assets. But, in our publicly funded, not-for-profit healthcare system are profit, sales, and total assets the tools we wish to use to measure ROI?

For e-health, and in the context of the public Canadian healthcare system, ROI might be considered instead the 'cost efficiency' of one system or infrastructure using e-health compared to that of another not using e-health. This seems straightforward enough, but there are many fundamental issues about which there is little understanding and little agreement.

What should ROI considerations include? Ideally, the total cost of ownership (hardware, software, implementation, initial training, operations staff, maintenance staff and services, and connectivity fees) as well as less tangible issues such as speed of care delivery and quality of care, workload management and patient satisfaction. How are these measured in meaningful, consistent, and comparable terms?

Whose perspective is of most relevance? When performing any economic analysis whose perspective is considered impacts which 'pot' or funding 'silo' gains or loses. This opens the door to the vagaries (and competition, and exaggeration) associated with budgeting exercises. In the final analysis only one group pays – you and me as members of our Canadian society; so should not the societal perspective be the gold standard?

Which economic model should be used for evaluating e-health - cost comparison, cost benefit analysis, cost utility analysis, cost effectiveness analysis, and so on? Each has been applied, but no agreement exists as to which is most appropriate for the e-health setting. Indeed some argue that the ephemeral nature of many benefits of e-health make use of such traditional models of demonstrating value inappropriate. But then what should we use?

Where might real savings be found? Savings are most likely to occur through reduced fragmentation and duplication of services, reduced medical errors, and increased efficiencies through shared information and services. The banking sector used ICT to reduce the cost of a transaction from dollars to cents by decreasing the occurrence of recurring, direct, variable labour expenses after a single technology expense (in the US this resulted in a 31% increase in efficiency, with the ratio of US population to banking industry workers growing from 109:1 in 1990 to 143:1 in 2000). Healthcare could see similar enhancements through increased use of e-health, particularly

through the use of IP-based broadband capability. CHII's mandate to develop a pan-Canadian EHR would eliminate the current need for developing and maintaining ad hoc interface engines, as well as reduce redundancy and increase efficiency and accuracy in distribution of patient information.

What are the potential impacts of achieving such savings? Many of them might affect human resources by reducing personnel (e.g. IT maintenance and medical records personnel), even eliminating some roles. These are emotive issues, and require careful thought and balanced discussion. The term 'dependency ratio' refers to the population of workers (economic contributors) to the population of non-workers such as children and the elderly (economic non-contributors). Due to demographic changes this ratio is shifting, and is a cause for concern. The same issue exists for the healthcare sector – the demographic reality is that we have steadily fewer healthcare providers to support the growing healthcare needs of a greying population. As a consequence concern about unemployment in the healthcare sector is flawed, and there may well be substantial inability to handle future healthcare needs unless we learn to work smarter, not harder. This includes embracing technological innovations such as e-health that enable this goal.

A notable discrepancy in terminology became apparent during the Conference, highlighting the continued 'Tower of Babel' environment of e-health. It was clear from some presentations that 'convergence' in the parlance of industry refers to bringing together voice, video, and data on one network. But there was a second use of the term 'convergence' within the e-health lexicon, identified by other speakers. For many in the e-health field, the current distinction between EHR (or telematics) activities and telehealth activities has been viewed with concern. Both are 'e-health' tools, and it is desirable – essential - to seek 'convergence' here also, developing both activities in concert. Indeed, the need for convergence can be argued to extend further. We have spoken of implementing *telehealth* into our current healthcare system for many years, with little sustained impact. Only recently have we begun to understand the difference between implementing and integrating, and begun to apply the lessons of readiness and change management to the field of telehealth. The same is likely to occur in the *EHR / telematics* environment, indeed the entire '*e-health*' environment, unless attention is paid now to addressing all health technology applications as one entity – to work together on pervasive (and persuasive) technology solutions that address not just clinical needs, but areas such as supply chain management, customer relations management, and workflow in a single cohesive system. That will be true convergence.

Significant advances and increasing application of e-health continues. "*e-HealthCare: What Constitutes Return on Investment?*" stimulated debate and revealed many open issues in terms of ROI; e.g. definitive methodology and documentation of costs and benefits of e-health technology, and the need for both broad and specific policies and procedures. In spite of these open issues the healthcare system and healthcare industry continue to capitalize on opportunities to adopt e-health, and as a result the public continue to benefit from this adoption. The sharing of perspective and experience that took place at this conference will lead us to building stronger ROI cases. There seem few who believe the 'value' is not there – but proving it in a transparent manner that satisfies the many stakeholders will need our combined and concerted effort.

Dr. Richard Scott
Vice-President, CST

ACKNOWLEDGMENTS

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The editor thanks Penny Jennett, Shirlee Sharkey, and Robert Filler for their assistance in final review of this report to ensure its value to the industry sector, and preparation of 'Overview' statements. In addition, the editor thanks Tara Perverseff for her support and assistance in preparing this report.

DISCLAIMER

The views expressed herein do not necessarily represent those of CANARIE, Industry Canada, or the Canadian Society of Telehealth.

Section I

Conference Details

Symposium Program

FRIDAY, 4 October 2002

06:30 – 18:00 **Registration**

07:00 – 08:15 **Industry Delegate Breakfast**

Dr. Alastair MacGregor, Associate Medical Director for Clinical Information Systems, Shriners Hospitals for Children International Headquarters, Tampa, Florida
“EHR Across Jurisdictions and Time Zones – What are the Limiting Factors in Deployment?”

08:00 – 19:00 **Exhibit Hall Open**

08:30 – 09:00 **Welcome & Opening Ceremonies**

The Honourable Colin Hansen, Minister of Health Services, Province of British Columbia
Dr. H. Frye for The Honourable Stephen Owen, Secretary of State (Western Economic Diversification, Indian Affairs and Northern Development), Government of Canada
Dr. Martha Piper, President and Vice-Chancellor, The University of British Columbia
Dr. Robert Filler, President, Canadian Society of Telehealth

09:00 – 11:00 **Keynote Speaker**

Linda Lizotte-MacPherson, President and CEO of Canada Health Infoway Inc.

09:30 – 11:00 **Panel Discussion**

ROI: Amidst the Changing Face of Telehealth

Moderator: Dr. Sarah Muttitt, Director & Senior Telehealth Consultant, TecKnowledge Professional Services (A Division of ADCOM).

Panelists: Dr. Ed Brown, N.O.R.T.H. Network
Linda Weaver, L.E. Weaver Consulting Inc.
(Via Video-conference)
Michael Calyniuk, Lead Partner, Technology, TICE Industry Practice Group, PricewaterhouseCoopers LLP
Barry Burke, Region Director Ontario Public Sector, CISCO Systems Canada

11:00 – 11:30 Nutrition Break

11:30 – 13:00 **Concurrent Podium Session**

- # 1: *Clinical Care and Disease Management - 1*
- # 2: *Outcomes and Evaluation - 1*
- # 3: *Sustainability and Integration - 1*
- # 4: *Telehomecare*

13:00 – 14:00 Lunch – Poster displays and Exhibit hall

14:00 – 14:00 **Panel Discussion**
ROI: Keys to Increasing Utilisation

Moderator: Ryan O'Connor, CEO, Cogent Integrated Solutions Inc.

Panelists: Dr. Trevor Craddock, President – The Keston Group Consulting Inc.
John Schinbein, CIO, Ministry of Health Services & Ministry of Health Planning,
Province of British Columbia
Doreen Tennant, Regional Telehealth Coordinator
Angie Sutherland, Telehealth Coordinator, Inuvik Regional Health and Social
Services Board
(with Video-conference to Holman, Northwest Territories)

1530 – 16:00 Nutrition Break

16:00 – 17:30 **Concurrent Podium Session**

- # 5: Policy – I
- # 6: Return on Investment (ROI) – I
- # 7: Clinical Care and Disease Management – II
- # 8: Outcomes and Evaluation – II

18:00 – 19:00 **Gala Dinner Reception**

19:00 – 23:00 **Gala Dinner**

SATURDAY, OCTOBER 5, 2002

07:00 – 08:15 **Breakfast Roundtables**

- Session # 1a - Global Policy Issues
- Session # 1b - Global Policy Issues
- Session # 2 - Telehomecare
- Session # 3 - Encouraging Educational and Clinical Use of Telehealth
- Session # 4 - Communications: To IP or not to IP
- Session # 5 - Discovery Analyses in Health Services – Data Mining in 2002
- Session # 6 - Stress.. Burnout.. Survival Strategies for the Telehealth Professional
- Session # 7 - Searching for the Answers! Financial Sustainability and Telehealth: A
Telelearning Discussion

08:00 – 16:00 **Exhibit Hall Open**

08:45 – 09:15 **Keynote Speaker**

Bob Webster, Vice-President & General Manager, March Networks Healthcare
Applications

09:15 – 10:45 **Panel Discussion**
ROI: Global e-Health-Telehealth 'in Action'

Moderator: Dr. Kendall Ho, Associate Dean and Director, Division of Continuing Medical
Education; Assistant Professor, Division of Emergency Medicine, University
of British Columbia

Panelists: Dr. Richard Scott, Fulbright New Century Scholar and Associate Professor,
Health Telematics Unit, University of Calgary

Christopher Armstrong, HIV/AIDS Policy Officer, Canadian International Development Agency
Dr. Ronald K. Poropatich, Colonel, US Army; President, American Telemedicine Association
Chuck Burt, Director, New Business Development, Ontario Enterprise Markets, Bell Canada

10:45 – 11:15 ***Nutrition Break***

11:15 – 12:45 ***Concurrent Podium Session***

- # 5: *Sustainability and Integration - II*
- # 6: *e-Learning*
- # 7: *Policy - II*
- # 8: *ROI – II & Technology Development*

12:45 – 14:00 Lunch – visit poster displays and exhibit hall

14:00 – 15:30 ***Panel Discussion***
Proving Value: How Do You Demonstrate Return on Investment?

Moderator: Dr. David Ostrow, Chief Information Office, Vancouver Coastal Health Authority; Professor, Department of Medicine, University of British Columbia
Panelists: Dr. Paul Dick, Assistant Professor, Paediatrics, University of Toronto
Robert Hanson, Senior Policy Advisor, Innovation and Investment Division, OHIH, Health Canada
Dr. Russell D'Souza, Melbourne, Australia (*Via Video-conference*)
Dr. Penny Jennett, Professor, Faculty of Medicine; Head, Health Telematics Unit, University of Calgary

15:30 – 16:00 ***Closing Ceremonies and Awards***

Distinguished Speakers

- **Michael Allen, MD**
Director Special Projects, Dalhousie University CME, Halifax, Nova Scotia
- **Carol Anderson**
Principal, CA Consulting, Telehealth Education Coordinator, Alberta Wellnet, Edmonton, Alberta
- **Christopher Armstrong**
HIV/AIDS Policy Officer, Canadian International Development Agency, Health, Population, & Nutrition, Hull, Quebec
- **Barry L. Burke**
Region Director Ontario Public, Cisco Systems Canada Company, Toronto, Ontario
- **Chuck Burt**
Director, New Business Development, Ontario Enterprise Markets, Bell Canada, Kitchener, Ontario
- **Edward M. Brown, MD**
Director, N.O.R.T.H. (Northern Ontario Remote Telecommunications Health) Network, Sunnybrook and Women's College Health Sciences Center, Toronto, Ontario
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Lead Partner, Technology, TICE Industry Practice Group, PricewaterhouseCoopers LLP Vancouver, British Columbia,
- **Trevor Craddock, PhD**
President, The Keston Group, Edmonton, Alberta
- **Russell D'Souza, MD**
Director & Consultant Psychiatrist, Continuing Care Psychiatry Program, Central East Area Mental Health; Senior Research Fellow, Mental Health Research Institute, Parkville, Melbourne; Honorary Senior Lecturer, Department of Psychological Medicine, Monash University, Melbourne, Australia
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Senior Policy Advisor, Innovation and Investment Division, Office of Health and the Information Highway, Health Canada, Ottawa, Ontario
- **Marilynne Hebert, PhD**
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- **Phil Jennings**
HNData Project Director, Information Management Group, Ministry of Health Services & Ministry of Health Planning, Province of British Columbia, Victoria, British Columbia
- **Harry Karlinsky, MD, MSc, FRCPC**
Director, Continuing Medical Education and Professional Development, Department of Psychiatry; Faculty Associate, Office for Faculty Development & Educational Support Faculty of Medicine, The University of British Columbia, Vancouver, British Columbia

- **Linda Lizotte-MacPherson**
President and Chief Executive Officer, Canada Health Infoway Inc., Montreal, Quebec and Toronto, Ontario
- **Sarah Muttitt, MD, FRCPC, FAAP, MBA**
Director & Senior Telehealth Consultant, TecKnowledge Professional Services (A Division of Adcom Videoconferencing), Edmonton, Alberta
- **Ryan O'Connor**
Chief Executive Officer, Cogent Integrated Solutions Inc., Vancouver, British Columbia
- **David Ostrow, MD, BSc (Med), MA, FRCPC, FCCP, FACP**
Chief Information Office, Vancouver Coastal Health Authority; Professor, Department of Medicine, University of British Columbia, Vancouver, British Columbia
- **Ronald K. Poropatich, MD**
Colonel, US Army; President, American Telemedicine Association; Senior Clinical Advisor, Clinical Applications Division, Telemedicine & Advanced Technology Research Center (USAMRMC), Washington, District of Columbia
- **John Schinbein**
Chief Information Officer, Ministry of Health Services & Ministry of Health Planning, Corporate Shared Services, Province of British Columbia, Victoria, British Columbia
- **Richard Scott, PhD**
Fulbright New Century Scholar; Chair, CST Research Committee; Associate Professor, Health Telematics Unit, University of Calgary, Calgary, Alberta
- **Keith Sheppard**
President, Collaborative Network Technologies Inc., St. John's, Newfoundland
- **Angie Sutherland**
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- **Doreen Tennant, RRT**
Regional Rehabilitation Manager, Vegreville Health Unit, Lakeland Regional Health Authority Vegreville, Alberta
- **Robert Vigneault**
National Infostructure Manager, FNIHIS, Health Canada, Ottawa, Ontario
- **Linda Weaver**
L.E. Weaver Consulting Inc., Halifax, Nova Scotia
- **Robert K. Webster**
Vice-President, Sales & Marketing, March Networks Healthcare Applications, Ottawa, Ontario
- **Milton K. Wong**
Chancellor, Simon Fraser University, Founding Investor, ALI Technologies; Chairman, HBSC Asset Management Canada Ltd.; Founder, The Laurier Institute, Vancouver, British Columbia

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Section II

Keynote Addresses

Evolution and Future of Telehealth in Canada

Linda Lizotte-McPherson. President and Chief Executive Officer, Canada Health Infoway Inc. (CHII)

The creation, vision, mission, business plan, and investment framework for the recently created Canada Health Infoway Inc. (CHII) was described, as well as the organisations priorities for 2002 and 2003. CHII is an independent, not-for-profit corporation that was established with a \$500M investment by the Government of Canada. It is intended to be a facilitator and strategic investor, not a granting body. CHII's Board consists of the Federal, Provincial, and Territorial First Ministers of Health who, in September 2000, agreed to "work together to strengthen a Canada-wide health infostructure to improve the quality, access, and timeliness of health care for Canadians."

The mandate of CHII is to accelerate the development and adoption of electronic health information systems with compatible standards and technologies across Canada. Within this mandate the immediate focus has been identified as seeking and implementing electronic health record (EHR) solutions. The concept of an EHR varies, and to ensure a consistent understanding, CHII has defined an EHR as a record that is available electronically to authorized health care providers and to the individual patient anywhere and anytime, in support of high-quality care. It is intended to provide individuals in Canada with a secure and private lifetime record of their key health history and care within the health system.

With this mandate in mind, CHII developed an evidence-based business case following an environmental scan. The scan revealed that the level of ICT spending in the health sector is very low, that jurisdictions are in still in the early days of EHR planning, that a good base of data 'feeder systems' exist, that no national standards development process exists, that physician use of technologies is very low, and that the privacy landscape is a patchwork of legal norms. These findings were also used to develop CHII's projected evolution for the pan-Canadian EHR.

In creating functionality and 'value chain' for the EHR, four 'Generations' are envisioned. Generation 1 constitutes the foundation, Generation 2 the documenter, Generation 3 the helper, and Generation 4 the mentor. Generation 1 activities include developing architecture, registries, community survey, and physician and consumer research. Generation 2 focuses on laboratory and diagnostic imaging projects. Generation 3 is the pharmacy initiative. These Generations are not considered to be consecutive stages, since aspects of each can overlap or occur simultaneously. Such a structured approach is anticipated to reduce the ultimate cost for the pan-Canadian EHR from \$2.5 – 4.1B or more to just \$1.3 – 2.2B.

With the above principles in mind, CHII's priorities in the next 18 months are significant. It is intended to develop detailed solution architecture, roll out a Canada-wide provider and client registry, and to establish pilot activities in terms of drugs (Generation 3 activity) and laboratory components (Generation 2 activity). In addition, diagnostic imaging pilots (Generation 2 activities) will be undertaken in community and acute care settings, a phase II national registry survey will be conducted, and attitudes of consumers to an EHR and privacy, and of physician's attitudes to technology and EHR solutions, will be researched.

It was emphasized that CHII will not function as a granting agency, but rather will 'strategically invest' in projects that meet the following criteria. They must enhance patient care and health care services, support development and adoption of the pan-Canadian EHR, build on existing strengths, promote partnerships and collaboration, leverage CHII's funding, and align with Federal / Provincial / Territorial (F/P/T) priorities and currently published and funded F/P/T healthcare ICT plans. The specific 'business lines' identified were ICT standards development, change management and process transformation tools, knowledge transfer and sharing, and developing competency in partnerships, privacy, portfolio management, and communications.

The Place of Broadband in Global e-Health

Bob Webster, Vice-President Sales and Marketing, March Networks

In today's healthcare environment the population is aging, costs are rising, human resource availability is shrinking, access is limited and alternative health care models are required. Opinions and approaches to achieving return on investment in the context of sustaining the telehealth sector differ. Ways in which the application of broadband technologies will support alternative delivery models such as telehealth, and to its adoption and long-term deployment, were presented. The Goldman Sachs classification of e-health and internet-related activities into five categories was described. These are connectivity (e.g., networks), content (e.g., on-line health information), commerce (e.g., B2B, B2C), community (e.g., chat rooms), and care (e.g., patient monitoring/telehealth). It was argued that whilst current activity has focused on the delivery of content, the real potential lies in using it to support care delivery.

Broadband, a digital high-speed network connection, has several key characteristics: it is able to transport any form of content (voice, video, data), it can transport this information at bandwidths that start at 128,000bps and moves up from there to several million, and it possesses an 'always-on' feature making it available at all times. While broadband has been viewed as slow to grow and expensive, the infrastructure continues to build and be financed by telephone companies, industry, and entertainment providers. Furthermore, the pricing trend is down for all network types notwithstanding the recession, and voice services are trending to essentially zero cost. Even satellite communication, expensive at this time, will have enhanced capability (2Mbps rather than 128Kbps), and reduced cost. As such, access costs are being radically reduced and opportunities for deploying broadband or appropriate applications in rural communities are strong. Yet the bulk of activity has been limited to pilot projects, and real deployment has been conspicuous by its absence.

Broadband has a critical role to play in delivering health services offering multimedia, high quality interaction, flexibility, and a network that is always available to the device it is connected to (i.e. allowing continuous monitoring). It has widespread user acceptance and can be affordably integrated as an every day tool to support the delivery of a broad range of health and social applications. Health care is in a position to take advantage of the growing broadband infrastructure to provide high quality, affordable care services to clients in a variety of settings.

Elements of telehealth sustainability include refining the business model, responding to patient demand for adopting more efficient and accessible ways of interacting with service providers, enhancing partnerships with technology, business and customers and promoting the adoption of telehealth as a productivity tool following the examples of computers and cell phones. The desire is to integrate broadband as an everyday tool, make it affordable, develop it to support delivery of a broad range of health and social applications, and to support efforts towards open architecture and interoperability.

Implications arise for stakeholders. Policy makers must work with industry relevant organisations to define framework requirements that support large-scale deployment, including reimbursement models. Healthcare providers must focus on clinical outcomes and include partners early in design to help achieve the sought outcomes. Industry associations must collaborate on lobbying and educational efforts. Finally, technology solution providers must ensure solutions meet market requirements and ease of use/implementation objectives, actively participate in lobbying efforts and educate/lead where appropriate.

Healthcare is in a strong position to take advantage of the growing broadband infrastructure and to extend telehealth to incorporate continuous monitoring through wearable and miniature devices, remote robotics, and holographic technology.

Section III

Panel Presentations

Panel #1

- ROI: Amidst the Changing Face of Telehealth -

Moderator:

Dr. Sarah Muttitt, Director & Senior Telehealth Consultant, TecKnowledge, Professional Services (A Division of ADCOM).

Overview

The growth of The North Network in Ontario, Canada's (and perhaps the world's) largest functioning Telehealth network, is an example of what can be accomplished when such activities receive appropriate funding. From a health industry standpoint the data presented gave a good indication of one way in which health care delivery will likely change over the next decade. From the technology industry perspective, expansion in networks, and purchase of teleconferencing and telehealth related equipment, might be anticipated if provincial governments decide to sustain the already functioning networks.

There are varying degrees of optimism about this latter possibility as noted in other presentations. The opinion was proffered that buyers often want more than industry can provide, because sufficient resources are not available to pay the vendor. Viable business cases might therefore be possible for companies that provide products, but not for those that provide knowledge. Even if this view is correct, the need for strategic planning for network design, telehealth applications, etc. will still be necessary. Industry must be involved in these essential functions.

The provincial government of British Columbia has become proactive in a plan to use new communication technologies to fulfill its public mandates. Telehealth has been singled out as the most important new "technology" to improve access to health care. Provincial government buy-in to telehealth is critical for further growth and sustainability of telehealth in Canada. Industry should note that BC is not alone in placing high priority on telehealth in its healthcare planning.

Cisco Systems indicated what most, if not all of us, believe about telehealth network infrastructure: it should be Internet based. The advantages of this approach are clearly outlined and industry should recognize and plan for a future with virtual private Internet networks and platforms that will completely replace the other connections that still exist today.

Individual Presentations

Building the Case for Telehealth

Dr. Ed Brown, Director, N.O.R.T.H. (Northern Ontario Remote Telecommunications Health) Network

Launched in March 1998, the NORTH Network (Northern Ontario Remote Telecommunication Health Network) provides medical specialist and allied health consultations for patients, and continuing health education for health professionals in rural areas of Ontario. The Network has grown from its original four sites in Northeastern Ontario to include 65 sites in more than 45 communities across the province, including a number of First Nation communities. Referral rates have been rapidly increasing, particularly with newer sites becoming operational, and the expectation is for 500 consults per month by year-end.

When considering Return on Investment, a major concern is that value propositions that were previously described have shifted. This recent evolution has changed the yardsticks, and moved the targets making it more difficult to demonstrate, or improve, return on investment. e-Health should be viewed as a 'value chain', extending from patients and healthcare providers, through organisations, and to the governments.

Sustaining a Telehealth Industry

Linda Weaver, Principle, L.E. Weaver Consulting Inc. (Via Video-Conference)

Differences in perspective between 'buyers' and 'sellers' of telehealth products and services were highlighted. Opportunities for industry were first placed into three categories: Is there a defined need (e.g. for a product or service); are funds committed (i.e. is the activity project-based or sustained); and can industry meet the needs (in terms of technologies, services, and expertise). These categories were then used to identify gaps in perspective that must be understood.

Is there a defined need? Whether a defined clinical need exists can be relative. A need may exist but not be recognised, or it may be recognised but not be of high priority for funders. Even if a clinical need is identified and funded, the question of product or service needs arises. Here the perceived needs of 'buyers' and 'sellers' may not be aligned. For example buyers will want specific products and/or short-term relationships, whereas sellers will want to provide value-added products and/or develop long-term relationships.

Are funds committed? In terms of funding, other challenges exist. A telehealth solution might be viewed as 'nice' but not essential and not funded at all, or not funded adequately to permit sustainability. Further challenges include the reality of the relatively small and distributed investments that have been made. Only topical projects may be funded by government(s), as evidenced by the shift in primary focus to the EHR, and what funding is made available for telehealth tends not to be predictable in terms of timing or amount.

Can industry meet the needs? Industry is being expected to provide a variety of technology needs (clinical devices, telehealth workstations, and infrastructure components), as well as services (project management or program management), and expertise (consulting; business case development). When considering each of these identified needs, a more important question becomes - can industry afford to meet the needs? The spectrum of clinical devices and infrastructure components could be very broad, encompassing more than just telehealth

applications, and the need for workstations is a relatively small volume market. Project management is only short term, and whilst program management is longer term, it is not usually outsourced. Finally, both consulting and business case development are short-lived activities that are often undervalued. Each of these circumstances argues against a viable business case.

Overshadowing these practical issues are matters of cultural perspective. The public sector often views the private sector with suspicion, sometimes hostility, believing their profit focus diverts funds from real health services, and that they cannot be trusted to safeguard patient privacy. In contrast, the private sector often views the public sector as fickle, being unable to make or meet a commitment, or understand timelines and competitive pressures, and having no respect for the value of expertise, time, or investment by industry. Despite this, there is increasing need to develop inter-organizational relationships in order for telehealth programs to succeed. In principle such relationships share 'risk' and 'reward', but public and private sector notions of risk and reward are very different and suffer many misperceptions.

It was concluded that significant gaps exist at this time between what buyers want, and what it is viable for sellers to provide. Industry should look to commodities as a strong opportunity, but view provision of telehealth technologies and expertise as a weak opportunity.

Can the Business Case for Telehealth be Improved?

Michael Calyniuk, Lead Partner, Technology, TICE Industry Practice Group,
PricewaterhouseCoopers LLP

A description was provided of a recent British Columbia initiative [Premier's Technology Council], before describing means by which business cases for telehealth can be bolstered.

Created in August 2001, and chaired by Premier Gordon Campbell, the Premier's Technology Council has brought together 18 British Columbia technology leaders from the private sector and academia. Their mandate is to 'provide advice to the Premier on all technology related issues facing British Columbia and its citizens'. They have focused their efforts on 4 strategic areas: access and opportunity, government operations and services, industry growth and development, and marketing and the public.

The council released its first report in November 2001, in which strategies were identified to bridge the digital divide and make British Columbia a recognised and desirable location. In April 2002 the council released its second report. This listed 45 recommendations for improving broadband infrastructure, increasing public access to the Internet, developing high tech industry, and marketing British Columbia. It also included specific recommendations such as working to develop province-wide health IT standards, ensuring that each Health Authority appoints a person to be responsible for information management and technology, establishing a British Columbia e-Health Think Tank, and extending standards to agencies and other government service providers. The latest report from September 2002 focussed on government IT procurement, e-health, and venture capital. It reaffirmed earlier recommendations, in particular the need for deployment of a high-speed network and establishment of an e-Health think tank, and provided further recommendations. For example, a mandate for the e-Health Task Force that includes: addressing the recommendations arising from the e-Health Roundtable, coordinating and leveraging current e-health initiatives, the implementation of an Electronic Health Record (EHR), addressing licensure, liability and billing issues; and conducting a community consultation process to identify critical needs.

As a result, the committee hosted an e-health roundtable in June of this year. Attendees (health care providers, health educators, and provincial and federal government representatives) were

asked to address the question: "Which e-health applications will have the greatest impact in improving access to health care services and reducing professional isolation, particularly in the remote and rural communities of B.C." The responses identified telehealth is the prime e-health application for improving access to and delivery of health care services, and reducing professional isolation for health care providers, and stated that telehealth is a proven concept and the time for projects is over. They also suggested that with a Network infrastructure already in place, the cost to acquire and deploy telehealth equipment is low, and that technology to enable telehealth exists.

The emphasis shifted to identifying six key elements for improving the business case for telehealth. Proponents were encouraged to 'begin with the end in mind' and to:

1. Build for the long term in all plans and negotiations - allocate resources to develop sustainability, to perform a controlled rollout, and to develop the stage for synergies to be realized.
2. Coordinate projects and leverage partnerships – learn from the mistakes as well as the successes of past studies, draw together similar or synergistic projects, and encourage partnerships.
3. Recognize and quantify the intangible costs and benefits that exist - improved clinical outcomes, reduced regional and professional isolation, increased productivity, and available on-the-job-training.
4. Identify the differing impact on stakeholders - measure and evaluate outcomes for the many stakeholders (patients, health care professionals, society, industry, IT/systems groups, regulatory bodies), and educate those affected.
5. Ensure transparency - identify the costs and benefits of alternatives, understand the business case of present operations to enable comparison, and prove cost effectiveness, opportunity costs, timesavings, travel savings, and hard dollar costs savings.
6. Plan for transition from projects and pilots to sustained operations - take successful projects to the next level, shorten the cycle by getting buy-in up-front, realize the added benefits and reduced costs, coordinate successful projects, leverage partnerships, and achieve new value (i.e. building *economies of scale*, and leverage the *network effect*).

'The Communications Infostructure' – Transition to IP and Implications

Barry Burke, Region Director, Ontario Public Sector, CISCO Systems Canada

The question of transition to IP-based e-health applications was posed not as 'will the communications infostructure be transitioned to IP?', but instead as 'when will the communications infostructure be transitioned to IP'? The belief was emphasized that the Internet will dramatically change how information flows and how people and organizations interact in healthcare with the implication being better patient care. The value of the transition comes from the convergence of IP infrastructure that will enable applications, allowing physicians, nurses, and caregivers to interact in a seamless and synergistic fashion that increases their productivity.

The importance and advantages of IP-based multimedia networks for health care were examined. They include ubiquity, single network infrastructure, scalability, integration with other applications, and lower cost for access to remote and legacy systems. There is much promise of commercial IP networks to deliver e-health services at a fraction of the cost, but at the same time maintaining, or improving, quality of service, availability, and scalability. The importance of the 'bandwidth on demand' aspect to support convergence of video, voice, and integrated data was noted, and identified in connection with the 'surgical grade network'.

Use of IP networks to aid in home health and disease management was introduced. Benefits for all stakeholders were identified (patients, families, and physicians) including: decreased need for hospitalization for chronic disease management; reduced negative impact associated with separation from family; reduced travel for patients (sometimes care providers); visual, voice, and data contact with the healthcare provider (reducing anxiety for patients recovering at home); and all achieved while providing a high level of patient and clinician satisfaction.

This 'wish-list' was identified as a reality, with the starting point being convergence of the network foundation to merge voice, video, and data onto one IP network. With this will come advanced applications to enhance communications between care providers, sharing of knowledge and information, mobility, improved patient safety, and quality of care. For the patient in an emergency situation, the value of real time exchange of vital information using multimedia and varied access points was identified as a means of ensuring a positive outcome.

When considering Return on Investment, investment in networks was noted to be required for convergence, and to have two requirements: lowered cost of "network" ownership (reduced overall network infrastructure costs, reduced application integration costs, and reduced ongoing network administration costs); and enhanced caregiver communication (improved patient care, enhanced staff productivity, increased knowledge sharing, enhanced patient experience, and greater staff mobility).

Case studies of organizations that have or are implementing IP Converged Networks were noted, and it was concluded that the faster we move to IP and Convergence the sooner the benefits to staff and patients will be realized.



Panel # II

- Return on Investment: Keys to Increasing Utilisation -

Moderator:

Ryan O'Connor; CEO, Cogent Integrated Technologies

Overview

Return on investment (ROI) is a part of every decision made in the private, and increasingly, the public sector. However, how to achieve ROI has not necessarily been determined. A recent Gartner Group Report (January 2001) stated "through 2004, only 35 percent of enterprises will adequately define the cost and benefit metrics desired from their e-CRM strategies before implementing tactical projects." This report further predicted that "55 percent of CRM and e-CRM initiatives will fail to meet measurable benefit objectives and will fail to positively affect ROI due to lack of business processes for conducting ongoing measurements."

A need exists for realistic, defined measures for cost and value terms. Further, telehealth goals must be in line with, and the investment must clearly contribute to, the goals of the organisation. Additional fundamental needs such as interoperability are essential to sustainability of projects and to ROI. In a time of limited resources, collaboration and sharing of experiences is essential. Proven project management processes must be adopted and risks must be avoided by ensuring projects are manageable and are measurable.

Individual Presentations

Technical Interoperability: National and International Perspective

Dr. Trevor Cradduck. President; The Keston Group, Alberta

Technical interoperability was described from a provincial, national and international perspective. The fundamental issue is that systems need to be able to communicate with each other in a meaningful manner; otherwise sustainability and ROI will be difficult to attain. Three perspectives were identified and examples were given for each:

The Provincial Perspective. Alberta We//net, a multi-vendor network where interoperability has been a key consideration, was discussed to illustrate the provincial perspective. The Alberta Research Council (ARC) has developed technical requirements that can be tested for compliance against international and industry standards. These requirements have been accepted by HISCA, Health Information Standards Committee of Alberta. The various health authorities also have an agreement to make collective purchases under a standing order.

The National Perspective. There are a number of initiatives presently underway to encourage interoperability at the national level, including: a CHIPP committee established to look at ways to

reduce the risk of projects becoming “islands of telehealth”, and the NIFTE project (a Richard Ivey Foundation funded-project) that is preparing a framework to develop guidelines and standards for clinical and organisational structures, as well as the technical layer of telehealth.

CIHI is also partnering with organisations to develop health information standards that are primarily based on EHR but have some telehealth focus.

The International Perspective. From the international perspective, the ISO TC 215 invited Canada to develop standards and ARC has been funded by Health Canada, under contract with CIHI, to pursue this activity. They were asked to develop standards for ISO, including real time video conferencing activities standards.

Further the Potential of ICT's – A CIO's Perspective and Strategy

John Schinbein, CIO, BC Ministry of Health Services and Ministry of Health Planning.

The presentation discussed how to successfully leverage the potential for ICTs to increase access to care, reduce the cost and emotional burden of travel for rural health consumers, enhance patient care and safety, improve working conditions for health care providers, support their ongoing education and deliver services in a more cost-efficient manner.

Many challenges to implementing ICT's in BC were identified, including: health care reform and regionalisation; the complexity of the healthcare sector (many stakeholders, often with competing interests); the immense geographic expanse of the province; capped health system funding and competition for scarce resources; the need for significant up-front investment (the Canadian health sector currently spends less than 2% of its operational funding on ICT's, compared to an average 5% in business, 9 -13% in the insurance sector, and an estimated 8% in leading not-for-profit health organizations in the United States); IT project risk (studies indicate over 70% of IT projects are unsuccessful - either over time, over budget, or they fail to meet user expectations); scepticism of physicians in adopting ICT's, (less than 10% of physicians actively use information technology in the daily clinical practice); piecemeal implementation of telehealth with no province-wide strategy for remote, rural and aboriginal communities (where the technology could make the biggest difference), and no comprehensive approach to linking remote areas to major regional centres; lack of technical infrastructure and a business case for industry to install or light up existing dark fibre (cannot be based on health applications alone); and policy issues (such as privacy, security, cost, care provider reimbursement and licensure require attention if ICT's promise is to be realised).

Strategies were recommended to aid in the acceptance and implementation of ICT's in health care. These included: Transformation of Information Management/Information Technology from a utility function to a strategic enabler; recognition by senior healthcare executives that some of the benefits of using the technology are hard (if not impossible) to measure in pure productivity or financial terms; investments in ICT's must be clearly aligned with the organization's goals and linkages to how they will contribute must be clearly evident; applications must be driven by business need and must have sustained leadership and involvement by the end user (rather than handing over to the IT folks to build and implement); and, projects should be manageable and results focused (projects with long duration are better to have a number of phases with tangible deliverable benefits in order to minimise risks).

The following requirements for increasing the success of ICT projects were emphasised: improve communications between all stakeholders; manage the politics of change; adopt good project

management methods; be less parochial and more open to collaboration; and implement risk management measures.

Successful Implementation for Stakeholders

Doreen Tennant. Regional Telehealth Coordinator, Lakeland Regional Health Authority

Challenges, goals, and outcomes of telehealth in the North East region of Alberta were presented. In this region, the health authority serves more than 100,000 people across a large geographic area. There are 13 telehealth sites providing clinical consultation, e-Learning services, teleultrasound, and administrative support. The challenges are great and include: climate, distance, health system restructuring, financial constraints, recruitment and retention of professionals, and a pressing need to improve the region's health status.

Four key points were highlighted for implementing a regional telehealth system. Incorporate measurable goals into the project business plan, adopting the idea "that which cannot be measured is of unclear meaning". Emphasise improved communications between all stakeholders, working on the premise that "buy in brings success" (for the Lakeland Region, this resulted in the project gaining the support of the entire organization, including the Board, the Executive, management, and front line staff). Ensure that telehealth goals and outcomes are in concert with those of the health region. Integrate telehealth into the daily operations and not consider it a line item.

The Lakeland Health Region telehealth program was successful in meeting four of the organisations business goals during 2001/02. The program: improved delivery of accessible, effective, quality services; improved the health and well-being of its residents; supported and promoted a system for health; and optimized the effectiveness of the health authority.

ROI was measured in terms of both 'value' and 'cost'. Data was collected to describe utilisation and calculate the cost savings of using telehealth within the administration, clinical, and education areas. Total gross savings were calculated to be \$296,750; operating costs were \$240,000 resulting in a net savings of \$56,750. The plan is to add 2 additional clinical applications each year, which will further increase the savings to cost ratio and ROI.

The Human Face of Return on Investment: The Community of Holman Speaks

Angie Sutherland, Telehealth Coordinator for the WestNet Telehealth network, Inuvik, NWT (Via Video-Conference)

Through a live video conferencing link the residents of the isolated community of Holman, population 425, were able to describe what telehealth means to them. Four people from the community took part in the discussion: a resident and lobbyist on behalf of the Inuit people of Holman, a nurse, a community health worker, and a resident. Facilitated by Angie Sutherland, the group described the benefits of telehealth to their community of Holman as well as some of the challenges in operating it.

Traditional physician services are provided every 6 weeks, weather permitting. Holman is 600 air miles to the nearest hospital and the cost of a regular flight to Inuvik is ~\$1,000.00. The region flies over 2,000 Medivacs each year at a cost of approximately ~\$10,000 each.

Telehealth has provided increased access to health and social services, urgent and emergent services, and physician clinics services. X-rays are transmitted to Inuvik for reading. The community is awaiting a stethoscope to check chest and foetal heartbeats. Video-conferencing is also being used to provide teaching and nutritional information for prenatal classes and for family visits. Pregnant women have to leave the community at 36 weeks, so video-conferencing is effective in keeping the family in contact. The people of Holman made it clear that telehealth has had a profound and beneficial impact on their lives and healthcare.



Panel # III

- Global e-Health – Telehealth ‘in Action’ -

Moderator:

Dr. Kendall Ho, Associate Dean and Director, Division of Continuing Medical Education; Assistant Professor, The University of British Columbia

Overview

The convergence of globalization, global health, and the network age reinforces the need for business to look at exciting new marketing opportunities and partnerships. Marketing and partnership opportunities for business are now arising in both developed and developing countries. Critical issues to address in these opportunities are cultural sensitivity, trans-border policy, local ownership, and sustainability.

Appropriate technology must be driven by health needs, be practical, sustainable, equitable and affordable. To achieve this, business requires knowledge on the use of ICT's specific to evidence-based care. Examples would include products and tools specific to: network technologies; electronic patient records; digital portable mobile devices; deployable telecommunication systems; data collection, storage, and sharing; as well as with training are required.

New business opportunities are arising in the field of Surgical Telehealth, including applications such as telerobotics, telesurgery, and telerobotics.

Individual Presentations

e-Health in a Borderless World or “Global e-Health”

Dr. Richard Scott, Fulbright New Century Scholar and Associate Professor, Global e-Health Research and Training Program, Health Telematics Unit, University of Calgary; Vice-President, Canadian Society of Telehealth and Chair, CST International Committee

The convergence of globalisation, global health, and the network age has created a need to look at healthcare on a more global basis and to consider the possibility of a “borderless world”. Global e-health (GeH) is a reality and holds the potential to redress the inequity of healthcare around the world. GeH is being promoted as a mechanism with which to redefine healthcare, to improve service and to achieve e-health for all. In the present and near future e-health activities include remote minimally invasive surgery, global public health surveillance, biotechnology, integrated informatics systems, global health network, geo-encoded health information, biochips and neurobotics.

Telehealth is currently active in numerous developing countries, which need assistance with investments of time, effort and money in developing e-health infrastructure. The return on investing in healthcare for developing countries includes facilitated learning between colleagues regarding traditional medicines and healthcare, and a healthier more productive population. For developed countries, the ROI includes a stabilised economy, and a greater marketplace for products and services.

A crucial perspective is the influence of local issues on global issues, and vice-versa. In some literature, this has been referred to as 'Glocal' (i.e. Global + Local).

GeH issues requiring attention include applying culturally sensitive approaches to GeH development and solutions, managing the changing actors and governance, and addressing policy matters such as nonexistent transborder policy regulations. The Health Telematics Unit's Global e-Health Policy Matrix is an effort to develop a practical and research tool that describes the areas complexities and inter-relationships. For Global e-Health to become a reality will require identification of common principles and development of complementary global e-health policy. A common strategy for approaching any problem is (1) Early problem identification, (2) Exploration and agreement of the nature of the problem, (3) Building of local capacity and global networks to address the problem, and (4) Reconciliation of domestic and global interests regarding the problem. In the Global e-Health realm we are emerging from (1) and entering (2) at this time.

A number of potential GeH policy research questions were described: What is the spectrum of policy issues around GeH? Who will have access? Which technological solutions are best for each country? Who will pay and how much? What socio-cultural implications does global e-health have for developed countries as well as developing countries and least developed countries? Finally, what are the further implications for healthcare and public health systems in terms of quality, access, and costs as a result of global e-health?

The Role of CIDA in Global e-Health

Christopher Armstrong, HIV/AIDS Policy Officer; Canadian International Development Agency, Ottawa, Ontario

Canadian International Development Agency (CIDA) is a federal agency administering the majority of Canada's aid. Its mandate is to support sustainable development in developing countries in order to reduce poverty and to contribute to a more secure, equitable, and prosperous world. Four social development priorities for 2000 - 2005 are health and nutrition, basic education, HIV/AIDS and child protection.

Numerous drivers of health and development are evident at the global level (e.g. Millennium Declaration (development goals), G8 summit: an enhanced commitment to development in Africa (2002), International conference on financing for development, Monterrey (2002)). CIDA's strategy for health embraces the following guiding principles: supporting developing countries in their own leadership in health, addressing the determinants of health through a broad intersectoral approach to health-in-development and reflecting Canadian foreign policy. CIDA is focussed on supporting systems that are strengthening their capacity to provide services to the poor. There is a need to find innovative ways to strengthen the quality and equity of health systems in resource-limited settings.

Global e-health (GeH) has a role to play in increasing opportunity for the provision of health care for the poor living in rural and isolated settings. The appropriate technology must be driven by health needs, be practical, sustainable, equitable and affordable. It must also be country driven

with local ownership and be developed within coordinated, multi-sectoral and comprehensive programming to enhance sustainability.

CIDA's involvement in GeH is illustrated by its chairing of the International Working Group on ICT for Health under the auspices of the United Nations Information and Communications Technologies Task Force & the G8 Digital Opportunities Task Force. These are international initiatives focussed on bridging the digital divide. The working group is grounded in the millennium development goals, addresses policy dialogue and is building an evidence-based case on the use of ICTs to improve health and health systems. The group's focus is on training and education, knowledge sharing, data collecting, and sharing health information to the general population.

Tele-Disaster Management

Col. Ron Poropatich. President, American Telemedicine Association; Chief, Clinical Applications Division in Telemedicine and Advanced Technology Research Centre (TATRC), Fort Detrick, MD, USA

Telemedicine's role in disaster management (natural and man made) can address terrorism, failed & failing states, transnational threats, asymmetric challenges and the rise of major military competitor. Telemedicine functions for disaster management are as follows:

In pre-hospital incident assessment environments: (1) Digital EMS can provide pictures and two way voice from a paramedic's workstation to the medical centre trauma specialist's workstation improving quality of emergency medical services. (2) Telemedicine Specialty Response Teams with deployable telecommunications systems can provide short duration, medical augmentation to local, state, federal & defence and be integrated with other specialty teams (e.g. chemistry, biology, trauma, etc.) They can also provide rapid insertion of dedicated ICT when local areas are lacking. (3) PDA's in the medical information environment provided point of care patient information, research support, evidence-based medicine and administrative (billing) support.

In a hospital setting: Clinical Teleconsultation (ER and ICU care) has shown effectiveness. In one project (9 ER Telemedicine operating sites) Emergency Medicine Tele-Consultation has improved quality of care, achieved a 97% patient satisfaction rating and resulted in 25% hospital savings. Remote consultation can also be provided via telemedicine to Electronic Intensive Care/Critical Care Units in which a nurse or physician can access patient information documents, databases, and decision-making support tools (e.g. algorithms).

No hospital situation: Forward Deployable Digital Medical Treatment Facility's (FDDMTF) can be dropped out of a plane and set up to provide mobile hospital and future medical shelter systems.

As a Public Health National Centers telemedicine can aid disaster management by (1) providing integrate diverse data sets, and (2) education to patients and providers.

Future applications and technologies currently being explored are Homeland Security Command & Control to assure connectivity during national disasters and the role of robotics in healthcare and disaster management to replace human first responders to pick up casualties and provide initial first aid treatment. Military and civilian collaboration can leverage such research, and is important for disaster management.

Evolving a Commercially Viable Surgical Grade Network

Chuck Burt. Director, New Business Development, Bell Canada

Surgical telehealth allows isolated surgeons or patients to be connected with experts. In remote regions of Canada and elsewhere, surgical telehealth is ideally suited to provide high quality, safe care to patients in the operating room. Training centres are now in place to facilitate safe learning in a simulated environment, provide mentorship and support and increase the national standards of practice.

One aspect of surgical telehealth is surgical telementoring in which a live connection is created between an operating and remote teaching expert surgeon using audio and video exchange, remote control of the field of view and telestration. As a result telementoring can result in safer delivery of more complex surgeries. Another aspect of surgical telehealth is telesurgery, which is an extension of telementoring and provides active support during live surgery. OR's are changing to include telerobotics which can extend the hand of the surgeon remotely to assist and perform.

The vision for the commercially viable Surgical Grade Network Pilot Project is to facilitate surgery across the Bell Canada network. In September 2002 a team of over 30 specialists gathered in Toronto to research and develop a highly customized, seamless solution that is managed from end-to-end and will support patients and be a highly available and secure network. Telesurgery capabilities have now been demonstrated over Bell Canada's commercially viable IP VPN-e network.

Network related research testing has demonstrated that: the VPNe network can deliver the required Security, Bandwidth, Latency and Quality of Service to support this application; current video compression technology provides good image quality, with acceptable latency and bandwidth; and that there is a requirement to provide real-time network monitoring to both surgical suites. Communication requirements for telesurgery are in the final stages of definition and surgery is planned before the end of 2002.

Bell's immediate goals are to: evaluate impact of latency on surgical precision; test the use of 3D imaging, electrocautery and harmonic scissors; evaluate use of satellite technology (TELSAT) with Canadian Space Agency; collaborate with NASA on application of telerobotic surgery to space station; prepare for possible telerobotic link to Chicoutimi and Yellowknife; and support Centre for Minimal Access Surgery (Hamilton) in preparation for first telerobotic survey with North Bay in November, 2002. Long term plans network expansion (4-8 sites/yr), consolidate telerobotic research, evaluate other telerobotic applications, develop algorithms for high latency telesurgery and demonstrate live telerobotic surgery at next CST Conference (Halifax, 2003).

Panel # IV

- Proving Value: How do you Demonstrate Return on Investment -

Moderator:

Dr. David Ostrow, Chief Information Office, Vancouver Coastal Health Authority;
Professor, Department of Medicine, University of British Columbia

Overview

These presentations suggest that there is a growing number and use of various evaluation frameworks for telehealth initiatives, and there is a need to have a standardized framework. However, it will require adaptability and flexibility of various technologies, settings, and populations to accomplish this. Any ROI is based in a social economics context, rather than a narrower, more traditional industry ROI, and therefore includes impacts on the health system, health organizations, providers, and individuals requiring health information, education and support – i.e. access, outcomes, etc.. In addition to the components of this non-traditional ROI, a focus on change as a social process (not just about technology) is essential.

Development and utilization of a standardized framework would lead to a database of evidence around telehealth initiatives and their value, and permit social value as well as the business ROI to be captured. The challenge is to determine how to adapt academic frameworks for application to the real environment. Accomplishing this task permit technologies to be leveraged into the mainstream to the fullest extent possible. The importance of change management as a social process has been recognized. Now telehealth initiatives, particularly as they come on to the mainstream, are not only about the installation of technology; instead change management is vital to enable transformation of access, models for care and data exchange.

Individual Presentations

Evaluation Frameworks – National Perspective (Clinical and Academic)

Dr. Paul Dick, Assistant Professor, Paediatrics, University of Toronto

It was identified that 'frameworks' contain assumptions and values that must be appropriate to the context in which they will be used. Several frameworks were discussed in an effort to determine if a Canadian evaluation framework for telehealth is emerging.

The term 'framework' appears throughout health evaluation literature, and different authors have noted various purposes for frameworks. For example, Field (1996) suggested frameworks

aim to strengthen individual evaluations and promote co-ordinated evaluation strategies. Alternatively the CHIPP Evaluation Guide (2000) suggests the purpose of the framework is to measurably demonstrate project results and to determine the cumulative impact of CHIPP funding. In contrast, Scott et al. (1999) argue the purpose of the framework is to convince policy/decision-makers of the usefulness of investment in telehealth. Despite the noted importance of the aims of framework, there is no widely used, explicit definition of 'framework'. Certainly a need exists for a method of organizing concepts and values, activities and stages, and measurements and data. Furthermore, there needs to be an organized list or matrix of principles, items or domains of importance in order to reflect the complex and multi-dimensional aspects of healthcare and its impacts.

The problem of developing a collective definition lies in two areas. First, the plethora of frameworks that have already been applied to, or recommended for, telehealth. Second, the tremendous diversity between the settings and applications of telehealth technology, and the many different stakeholder groups interested in telehealth policy and applications. Various examples of research on frameworks are identified below.

Several examples of research into telehealth frameworks can be noted. Example 1: Clinical research & development. The Structure-Process-Outcome (or Donabedian) model that has been applied in telehomecare project evaluation frameworks. Example 2: Project funding accountability. The CHIPP 2000 Evaluation Guide designed to demonstrate project results, ensure comparability across projects, and permit estimation of the cumulative impact of a program. Example 3: Policy health & business cases. The Institute of Medicine framework, designed to justify investment in research programs, policies, and major funding initiatives through four measures of care: quality, accessibility, acceptability, and cost. Example 4: Capital Health Telehealth Business Case (Gebran, 2002) that presents a business case template format using key performance indicators: multi-department planning, goal-setting, cost-projecting, and ROI estimation. Example 5: Standards & quality measurement. The 'Balanced Scorecard' framework (Isaacksz, 2002), the purpose of which is to provide a holistic performance measure use in evaluation, comparison, and ongoing quality improvement. This framework uses a holistic concept with four quadrants, each with key indicator measures: (1) financial, (2) patient/provider satisfaction, (3) clinical utilization and outcomes, and (4) system integration and change.

Two important questions arise in relation to frameworks. (1) Does a framework validate or improve the evaluation content? Evidence from, for example, systematic reviews of cost effectiveness studies of telemedicine interventions would suggest not, with only 55/612 studies presenting cost-benefit data, and only 7/612 presenting utilization thresholds. (2) Does a framework ensure better decision-making by service providers and policy/decision-makers? Only if the right questions are answered, and this is difficult when considering the sources of complexity of the task, where sometimes divergent concepts, purposes, and stakeholders require a multi-dimensional approach. These considerations highlight the trade-offs that may be necessary when trying to balance eclecticism and uniformity, and general versus specific indicators and measures. The overriding question is - how do we move forward constructively, together?

It was concluded that each approach has its value. Eclectic research activities spawn concepts and tools for more organized and uniform indicators, whilst efforts at uniformity (such as national policies and report frameworks) should aid in implementation and maintenance of quality. The concept of a unified framework is a powerful concept, but only if it can orient and unite our actions and generate concrete tools. To move towards a unified framework we must first identify principles, definitions and key indicators that are threads interwoven into any framework.

CHIPP and Its Evaluation – Hopes and Expectations

Robert Hanson, Senior Policy Advisor, Innovation and Investment Division, OHIH, Health Canada

ROI in the private sector is typically thought of in terms of profit and dividends to shareholders. In the public and non-profit sector, the notion often shifts to cost-savings or greater efficiency. Fundamentally, concern is 'what are you getting back from the money you've spent'. In recent years, the federal government has invested several hundred million dollars in health infrastructure in Canada through various initiatives. Launched in 2000, the Canada Health Infrastructure Partnerships Program (CHIPP) is contributing \$80 million to support the implementation of innovative telehealth and electronic health record (EHR) applications in health service delivery across Canada.

The CHIPP program has three objectives:

- Provide incentive support for collaboration, innovation, and renewal in health care delivery through the application of information and communications technologies (ICT).
- Support large implementation model telehealth and EHR projects to accelerate ICT-enabled health care delivery renewal
- Improve the accessibility and quality of health care for Canadians, while increasing efficiency and protecting the long-term viability of the health system.

Beyond the above noted objectives of the program, several themes are emerging. For example, the program is care-specific – e.g. mental health, diabetes, cancer, coronary care; the clientele is mostly made up of First Nations and Inuit, seniors, women and children; and common applications include consultation, imaging, professional development, and tele-visits.

To help determine success, each CHIPP-funded project, and CHIPP itself, will be evaluated. Evaluation is intended to provide the data required to prove a business case, or demonstrate ROI, but review of CHIPP project evaluation plans has identified four key considerations: accountability, generation of knowledge, a focus on change as a social process (i.e. it's not just about the technology), and the limited time-frame within which to evaluate impacts. In addition, the CHIPP projects have provided a base of 29 different approaches and examples of evaluation. Building on the IOM model, these project evaluations are facilitating development of an evaluation framework with unique characteristics, one that is; adaptable to a variety of telehealth and EHR initiatives; reflects the needs of a publicly-administered, publicly-funded health care system; and addresses broader considerations. The latter include integration, health and related impacts, lessons learned, technology performance, and privacy.

The Clinical Proof

Dr. Russell D'Souza, Melbourne, Australia (Via Video-conference)

Given Australia's vast rural and remote areas, there are seven pressing issues effecting mental health in Australia. They are: (1) mental health resources are inequitably distributed to rural and remote areas; (2) populations are spread across great distances; (3) current availability of professional including psychiatrists is inadequate; (4) psychiatrists visit some areas once in 3 months; (5) some areas rely on a visiting mental health worker; (6) mental health resources are difficult to attract and retain; and (7) morbidity is high without treatment thus perpetuating dysfunction due to mental health problems.

Telehealth is a tool that can be used to ease the pressures that rural and remote Australia faces when addressing mental health. Although telehealth will not replace the need for face-to-face

assessments and interventions, it can be used as a tool for better distribution of the psychiatrist's skills to this disadvantaged Australian population. As such, availability of specialist care will be quicker and closer to patients' homes. In addition benefits of telehealth also include: reduced tangible costs of prolonged burden of untreated illness; reduced transportation costs; fewer days taken off as sick leave and; decreased intangible loss from suffering and grief of patient and family.

In what ways can telehealth offer return on investment? Four main ways in which telehealth can offer ROI are: telemedicine can be used to reduce acute psychiatric morbidity, telehealth can offer effective care locally (thereby reducing costs of transport and lost earnings for family, patient & community); it is useful in attracting and retaining and maintaining skills for local resources and lastly; telehealth is useful in post discharge outcomes reducing hospitalization, medical costs, loss of earning and intangible costs of illness.

The benefits of telehealth are illustrated by a study that occurred in rural Australia and focused on psychiatric patients. The patients were randomly allocated into two treatment arms: treated locally with telehealth and; a cohort of matched patients managed at a specialist psychiatric unit of metropolitan hospital. The study was conducted to examine health economic parameters and used the BPRS and BASIS outcome instruments.

The results are as follows:

- On average, patients moved from the moderate/severe category of depression into a mild category between weeks 2 and 3.
- Patients who consider spirituality important can benefit from this therapy
- Both the Objective and Subjective evaluation suggests improvements over the control group
- While there are limitations with extrapolating these findings, further studies in this area will be required to replicate these results in different groups

Telehealth offers returns to investment by: improving health & well being of the community; reducing dysfunction and disability of untreated illness; better utilization of the health dollars; allowing for accessibility, affordability and availability of health care to hard to reach locations and; reducing suffering, grief and hardship to patient, family and the local community

Issues in Providing Evidence with Respect to Socio-Economic e-Health Impact

Dr. Penny Jennett, Professor, Faculty of Medicine; Head, Health Telematics Unit, University of Calgary; President, Canadian Society of Telehealth

The value of e-health was defined from the viewpoint of socio-economic indicators. A recent study has examined what evidence, and what quality of evidence, exists that e-health can impact socio-economic issues related to health or health care. Whilst published research still suffers from methodological limitations, this study has provided researchers, and policy and decision makers with a refreshed perspective. Implications exist for access to health care, avoidance of travel, quality of care, and costs.

Preliminary results from the study were summarised for only 4 of the areas studied.

Mental Health. Telehealth has been found to have good evidence for use in treating depression in primary health care (telephone-based interventions improved symptoms of depression in different

populations). Telephone-based behaviour therapy for persons in rural areas with panic disorder or agoraphobia is also effective. Similarly, evidence exists for telehealth in neuropsychological rehabilitation, with it being well accepted and cheaper. In contrast, no convincing evidence was found for telephone-based intervention in providing Alzheimer's caregiver support.

Teleradiology. Most teleradiological studies used the healthcare provider perspective (including transportation costs paid mainly by the system). Therefore, the potential cost savings reported, which includes savings in unnecessary transportations and specialist visits, mainly benefit the health care system. Timesavings for patients were also seen to be considerable, and teleradiology had a positive effect on doctors' education and environment (reduction in film development, etc.). The main impact of teleradiology was on improved access to specialist services, which can be seen as an equity consideration. Teleradiology also offers an opportunity for quality control of images and their interpretation, thereby potentially improving quality of care as well as health care provider skills and working conditions.

Telerehabilitation. Individuals with brain injury were able to use computers for rehabilitation, and those with mobility problems were able to use computers to improve mobility. Pressure ulcers can be assessed by telehealth, and individuals with cardiovascular problems can receive therapy by telehealth. Also, children with sensorineural deafness can improve speech perception by using various computer programs.

Geriatric Health. The psychiatric and mental status of individuals can be assessed by computer, and suicide rates can be reduced by telehealth support. Support for caregivers of demented individuals can also be provided by telehealth. Patients with hypertension can be monitored by telehealth resulting in improvements in their hypertension condition, and patients with congestive heart failure can be monitored and supported by resulting in fewer hospitalizations. Cardiology services can provide diagnostic support and treatment plans for patients whose ECG and symptoms are forward to general practitioners using telehealth applications. In regard to drug treatment, individuals using a computer program have greater knowledge of the interactions of medications with alcohol and over-the-counter medications, and patients with atrial fibrillation treated with flecainide have fewer adverse outcomes when monitored by telehealth.

Telehealth has also significantly improved outcomes in studies of preventative care, osteoarthritis, cardiac rehabilitation and diabetes, but most evidence of its efficiency is in neuroteleradiology, telepsychiatry, ECG transmission, teledermatology, tele-homecare, and some medical consults.

The findings from this study have clear implications regionally and federally. For example, the need exists to identify circumstances that provide the greatest opportunity of success, and tele-homecare (or home telehealth) can be regarded as the next major step for telehealth. A variety of issues have also been identified. These include the lack of definitions, the need to make use of what we do know & respond to the gaps, the very limited study of the social impact of telehealth, a lack of understanding of public preferences, and the continued need for quality studies and existence of barriers to implementation

Section IV

Concurrent Sessions

Clinical Care and Disease Management

Overview

The power of telehealth as demonstrated in all of the presentations in this session is found in the opportunity provided for the patient to remain “at home” or at least, “closer to home.” They also amply demonstrate the broad breadth and depth of telehealth applications that are in use today. Analysis of them allows one to predict the potential for Telehealth growth in the future.

The study from SWOT in Ontario represents the “traditional” health application of providing tele-consultation from tertiary care centres to distant rural sites on an elective basis. The use of telehealth in more urgent medical situations is described in the BC Emergency Room pilot study, the Telestroke project in Ontario, and in the intensive care unit setting in the Manitoba and California reports. While these projects were designed to improve access to emergency care for remote sites, access is also an issue in large urban areas. Industry should be aware of the large potential of these urban markets when telehealth is applied to the provision of emergency healthcare in our cities.

The provision of care in the home over the Internet for diabetics (@your side), and the New Brunswick chronic disease management at home, are examples of homecare applications that could be useful for a vast number of people. Telehomecare (or Home Telehealth) represents an area of e-health whose value is just being recognized. Wide use and availability of the Internet for telehomecare promises to have great importance for industry.

Videoconsultation is now a well-accepted method for providing access for those with behavioural and psychiatric disorders, another telehealth application with excellent growth potential. Teledermatology and teleophthalmology, applications which use special cameras to transmit unique images over networks, are examples of the need for “non traditional” telehealth businesses to be aware of telehealth so that their products can add to the improvement and expansion of the field.

Individual Presentations

Just In Time Support: Physicians' Perceptions of On-Demand Emergency and Trauma Teleconsultations - Rural Community Impact

Ho K, Jarvis-Selinger S, Novak Lauscher H, Rhodes S, Cunningham J, Purssell R, Simons R, Taulu T, Windle C, Linton G, Parnell T, Kotlarz J, Rysavy J, Bradley C, Malhotra D. Division of Continuing Medical Education, Faculty of Medicine, University of British Columbia.

The purpose was to document the experiences of rural physicians who accessed just in time teleconsultations with emergency physicians at large urban hospitals. The study used semi-structured interviews with 18 rural physicians who had initiated 55 teleconsultations. Research questions focused on perceptions of the utility of teleconsultations, challenges and experiences, and benefits and drawbacks of videoconferencing. Selected benefits include avoidance of patient transfer, availability of colleague and expert advice, reduction of professional isolation, and social benefits in regards to supporting patient care. Some challenges include the need to overcome initial anxiety with using the system, and other technical challenges. The study concludes that continuing data collection and analysis at the end of the pilot period will confirm the utility of teleconsultation in providing comprehensive care to patients through a virtual network of specialists.

Outcomes of Paediatric Critical Care Inpatient Telemedicine Consultations to a Rural Adult Intensive Care Unit

Dimand R, Marcin J, Kallas H, Struve S, Nesbitt T. University of California – Davis, Sacramento, CA, USA

This study addresses the problem of non-urban hospitals typically being underserved with respect to paediatric critical care and subspecialty services. The study goals were to determine the impacts of paediatric critical care telemedicine consultations on the process of quality of care that infants and children receive in an underserved rural community adult ICU. Methods used for telemedicine were telemedicine units in Mercy Redding's ICU (rural site) and in the PICU at UC Davis Children's Hospital (urban site). Methods for four patient groups included telemedicine consultation patients (n=47 patients), all patients during telemedicine (n=180 patients), pre-telemedicine patients (n=116 patients), and transfers to UCDCH PICU during telemedicine (n= 86 patients). Paediatric ICU evaluations based on the paediatric risk of mortality was used to assess severity of illness, efficiency, length of stay, mortality, and second, PICU provides benchmark comparison to 33 PICUs across the country for mortality and length of stay.

Results are presented for patients studied, patient population, mortality, length of stay, provider telemedicine satisfaction, and parent telemedicine satisfaction. Financial results indicate telemedicine was highly cost effective. The study concludes that paediatric critical care telemedicine consultations can be successfully provided to a subgroup of critically ill infants and children in a rural ICU.

An Evaluation of Comprehensive Telehealth Disease Management Programs for Clients with Diabetes

Larsen L¹, Rigg N². ¹Saint Elizabeth Health Care, Markham, Ontario; ²Vancouver Coastal Health Authority. Nancy Lefebvre, Saint Elizabeth Health Care; Eileen Walsh, Vancouver Coastal Health Authority

The burden of disease is a problem on a global scale, particularly in terms of diabetes. The purpose of the study was to evaluate a comprehensive web based disease management program (called @Your Side) for clients with diabetes in a home care setting and within an acute care outpatient setting. The components of disease management are: population identification process, evidence based practice guidelines, collaborative practice models, patient self management education, process and outcomes measurement, and routine reporting/feedback loop. The methods used were mixed and included questionnaires, interviews, and focus groups. The outcomes included client, provider, economic outcomes, and quality of care. Client measures were physiological measures; self care management, knowledge uptake, and satisfaction. The study concludes that the web based disease management program results in improved outcomes and decreased costs. Furthermore, innovative web based technologies can aid in education and care of patients with diabetes.

Tele dermatology: The North Network Experience

Lester R¹, Brown E¹, Garner P², Affleck R³, Roston B¹. ¹NORTH Network, Sunnybrook & Women's College Health Sciences Centre, Toronto; ²Kirkland and District Hospital and; ³Lady Minto Hospital

The diagnostic concordance between tele dermatology and in person dermatological care was examined. The potential obstacles with tele dermatology are: poor quality images, inability to do biopsies, and decreased monitoring and treatment adjustment. In terms of patient costs, the NORTH network is compared with an out of town specialist. Patient cost and patient time to attend the consultation is substantially higher for the out of town specialist. Satisfaction was assessed for patients and referring physicians with the use of questionnaires. Both groups reported high levels of satisfaction, but preference for telemedicine was mixed.

Care Closer To Home: The Southwestern Ontario Telehealth Network (SWOT-N)

Lloyd S, Robinson D, MacLean N. Southwestern Ontario Telehealth-Network, Westminster College, University of Western Ontario

Within Southwestern Ontario (SWO), there is a significant amount of healthcare restructuring happening to address problems associated with medically underserved areas, a large geographical area making for greater travel time, and an increasing demand for services due to the aging population. Video Care, the telehealth network in SWO is aimed at providing care closer to home. Seven clinical areas are noted and include regional dialysis program, specialized geriatric services, oncology, regional stroke strategy, regional paediatric program, ophthalmology, and radiology. The study focuses on three clinical pilot projects: the regional geriatric program, the regional renal dialysis program, and the London regional cancer center.

For Videoconferencing technology, the service offers things such as authentication, authorization, global site directory, and advanced call scheduling. The operational management is fourfold and is made up of the Video Care SWOT-N Steering Committee (to represent all partner organizations), Video Care SWOT-N Staff (physicians, managers, etc.), clinical steering committees (defining clinical goals), and hospital steering committees (defining hospital goals and objectives). Operational management further looks at region-wide sustainability planning, evaluation (with respect to clinical outcomes, cost, travel, effectiveness and technology), and communication (i.e. with the media and the public). The factors noted to affect sustainability include: technology being user friendly for the clinical group, standardization across the region, and integration into health care practices.

Chronic Disease Management Using e-Health Principles

Palmer K, Reid L. Atlantic Health Sciences Corporation, Saint John, New Brunswick

The Interactive Real-time Image and data Solution (IRIS), originally built to support tele-emergency and the collaborative care model/primary health care, is the first Canadian emergency telemental health consultation. Technologically, IRIS is wireless IP based and ISDN, and is capable of performing real-time and store-and-forward functions. The outcomes examined were access and quality, cost effectiveness, and acceptability.

The results for each of the outcomes indicate that for access and quality, connections were increased from monthly to weekly, and waitlists were shorter. The equipment was found to be less expensive, and it eliminated travel expenses. The service appears acceptable, as fewer patients are likely to miss their appointments as compared with personal visits.

Cognitive-Behavioural Therapy Efficacy via Videoconferencing for Social (Public Speaking) Anxiety Disorder: Single Case Design

Pelletier M-H¹, Long B¹, Stamm BH², Taylor S¹. ¹University of British Columbia, Vancouver, British Columbia; ²Idaho State University

Telehealth technology can bridge the gap for those individuals who require Cognitive-Behavioural Therapy (CBT) but have no access to a tertiary centre. Videoconferencing provides an effective medium to deliver CBT, as it allows the monitoring and evaluation of the visual aspects of this disorder. Four of five participants in the study experienced a decrease in anxiety, as well as an increase in speech task duration. The exploratory analysis agrees with the hypothesis that participants would reduce their social anxiety symptoms. What isn't known is whether for the participant for whom there was little to no improvement, there would have been a different result using CBT delivered traditionally, face-to-face.

Teleneonatology: Towards A Virtual NICU

Seshia M¹, Loewen L², Adair L³. ¹University of Manitoba, Department of Paediatrics, Winnipeg, Manitoba; ²MBTelehealth, Winnipeg, Manitoba; ³Women's Hospital, Winnipeg, Manitoba

Improving the care of sick newborns in remote areas is the goal behind this project, which links the Children's Hospital neonatal ICU in Winnipeg to the newborn nursery in Thompson, three hours away. From the beginning, health professionals involved at both sites were "on board", a key success factor. Integrating the new service into the regular workflow, without disruption of care as currently delivered, was also integral to success. Dedicated beds, a camera mount allowing views of two beds, identical equipment at all sites, and careful floor marking to ensure exact re-positioning of equipment was also discussed as necessary provisions for this project. Benefits of the service, which allows remote monitoring of neonates, include: more appropriate transfers of sick infants; improved access for case conferencing; less patient/family disruption; and expected retention of paediatricians in the remote sites, as with support from the tertiary centre, the child is able to remain in their community.

Benefits of Delivering Speech Therapy to a Post-Laryngectomy Patient in a Remote Northern Community: Case Study

Spencer T¹, Myers C², Loewen L¹. ¹MBTelehealth, Winnipeg, Manitoba; ²St. Boniface General Hospital and Cancer Care, Winnipeg, Manitoba.

Using an IP videoconferencing connection, with a supplementary microphone to ensure maximum sound transmission, speech therapy and training were delivered to a salesman who had undergone a laryngectomy. This man had experienced an immediate loss of voice and required training to use a device to speak. As many rural speech therapists do not have experience with post-laryngectomy patients, this project provided an opportunity to see if telehealth could provide an alternative to having the patient travel outside his community. Many benefits to this approach were reported including: flexibility of appointments, travel savings, and knowledge transfer. Post-laryngectomy patients have a low tolerance for illness, so not having to take public transit and attend a tertiary centre reduced the patient's risk of infection, and (by his own admission,) lowered his stress level. Unanticipated benefits were found in the ability of the digital camera used to help position the device against the throat, providing immediate feedback to the patient. As well, it provided a visual aid for the therapist when providing training to the patient for proper positioning of the device when using the telephone.

Tele-Stroke – An Emergency Tele-Health Initiative

Jaigobin J¹, McLellan A², Waite³. ¹University Health Network; ²North Bay General Hospital; ³NORTH Network, Toronto, Ontario

Stroke is the third leading cause of death in Canada. Most specialists are found in the larger centres, where rapid assessment teams work together to support the patients. However, those living outside urban areas don't have the same access to this high level of care. Remote stroke consultation over distance through the NORTH Network provides local care teams with the expertise of specialists when determining whether to administer t-PA. The creation of identical protocols for treatment at each site, along with clinical support documents, were critical to this process working, as were written agreements between the sites, delineating the roles. Strong evaluation tools have been developed to measure patient and provider satisfaction, and clinical outcomes data is being gathered and integrated with data from across Canada. Telestroke rounds are under development, and mock consultations are being designed for practice and "refresher" sessions.

Effectiveness of a Tele-Ophthalmology Application in a Remote BC Community

Ma P, Seth A, Hay D. UBC/VH Department of Ophthalmology, Vancouver, British Columbia.

Enhancing ophthalmic care for First Nations in remote communities is achieved through this project, which employs a mobile digital fundus camera and store-and-forward technology. 'Low-tech' personnel can provide accurate and cost-effective yearly exams. Software has been developed to allow for capture of images, biographic and exam data, and their transfer by CD or email. While over 35 of the 241 patients seen were diagnosed with moderate retinopathy, 75 were identified as having other eye-related disorders such as cataracts or macular degeneration. Detection of these cases now allows for treatment and follow-up. A 95% patient satisfaction rate with the teleophthalmology service is reported. The cost of providing the service to date (including capital purchases) works out to less than \$1000 per exam, which is already less than what it would cost to send the patient to an urban centre.

Isolation and Access: Evaluating a First Nations Telepsychiatry Pilot Project in Remote Ojibwa and Oji-Cree Communities

Mckenzie O, Edye F, Keresztes C and Chase C. Keewaytinook Okimakanak Telehealth, Balmertown, Ontario

Using ISDN and SW56 network connections and PC-based technology, mental health treatment and education are being delivered from Winnipeg to two First Nations communities in remote areas. A community-based mental health needs assessment was undertaken before the new service was provided. Challenges included language and cultural barriers, along with a lack of technical experience. Much promotional work was undertaken to provide information and overcome doubt - including in-person visits to nurses, chiefs and home visits to individuals in the communities. After a year of service, 100% of the people who used the service liked it and wanted more, and the cost effectiveness of a telehealth visit was proved – at almost 1/3 of the cost of a “regular” visit. Suggestions to broaden the scope of the service include sharing the services of community “specialists” such as spiritual counsellors and traditional healers.

Outcomes and Evaluation

Overview

A broad spectrum of telehealth applications was showcased in these presentations, emphasising the need for industry to be alert and visionary in developing appropriate technology (hardware and software) for specialised settings. The focus on Internet based applications was evident. Only three papers focussed on the issue of evaluation tools (framework and indicator development), which has been frequently identified as an urgent need whose resolution would develop the needed 'evidence base'. This would encourage telehealth implementation and integration, and solidify the telehealth industry base in Canada. It was noticeable that a large proportion of evaluations reported being 'in process'.

Individual Presentations

Videoconference Based Goniometer and Long Term Tele-Assisted Physiotherapy Exercise Program for Homebound Seniors

Bernard M-M¹, Pelletier J¹, Meunier L¹, Brown S². ¹PACE 2000 International Foundation, Ottawa; ²Family Physiotherapy Centre, Ottawa.

Homebound seniors are the fastest growing population, and the demand for rehabilitation in a home setting has skyrocketed in recent years. This means there is pressure for better care at a lower cost. Programs for Autonomy and Communication for the Elderly (PACE), provides a virtual village for frail and homebound seniors. The objective of the study was to assess the effects of long term physiotherapy program on: quality and health outcomes, accessibility, and costs of health care for homebound seniors. 25 participants, with an average age of 78 years, all with chronic diseases were recruited. A total of 22 questionnaires were filled out.

Results indicate that quality care and health outcomes improved. For example, patients reported being less depressed. Accessibility to telephysiotherapy for patients was positive, and physiotherapists noted such benefits as increased participation and educational application. The service was found to be cost efficient, and the financial benefits of long-term e-use are mentioned. The study concludes that telerehabilitation fosters continuity in managed care plans and community integration.

Northern Ontario's Telephone Triage Pilot Project: Description of Callers

Hogenbirk JC, Pong RW, Lemieux S, McFarland V. Centre for Rural and Northern Health Research, Laurentian University, Sudbury, Ontario

The teletriage service in Northern Ontario is a 24/7 service with trained registered nurses answering questions on various health information topics and providing advice on the most appropriate level of care. The goals of telephone triage are to reduce the demand on existing health care resources by advising callers on care issues, to provide a standardized source for health information and availability of health services, and to promote patient independence and self-confidence in their decision making. Data for the study was collected from three sources: 28,000 call records, 2400 questionnaires, and 1996 census data.

The number of people who called the teletriage service over the 22 months of the study was 101,000, which represents about 8% of people in the service area, and more than 25% of those calls were taken between the hours of 4 and 8 pm. People called 90% of the time with questions regarding symptoms, and 66% of people who called were not the patient. Demographics of callers: 63% of callers were female, most were married, and calling for a young son or daughter. Information on age, language, education, household income, and geography were also obtained and presented.

When is a Picture Worth a Thousand Words?

Kaufman T. Second Opinion Software, Los Angeles, California

When is a picture worth a thousand words? When it can be acquired, transmitted, and received at a remote site with the relevant clinical content still intact. Although simple in principle, the potential to accomplish this goal is complicated by many factors: Medical specialty, communication methodology, bandwidth, e-mail attachment file size limitations, available image acquisition equipment, type and size of the image files, compression technology, storage and archive capacity, and cost of equipment to acquire the content. Results were presented of a study designed to quantify the quality and practicality of acquiring, managing, and communicating still images and video clips in today's digital world.

A variety of different technologies and instruments were used to acquire still images and video clips, and the size of each uncompressed and compressed image documented and compared. The estimated time of transmission for these images and clips, using a variety of communication technologies, was then documented. For images of 20K to 20Megs the transmission times ran from a few seconds to many hours, and the quality of the images varied depending on light, optics, and the technology used.

Based upon these results, it was concluded that decisions concerning the technology to use to acquire still images is not a question of quality but rather a question of practicality. The best image quality available is sometimes simply not practical, and how the images are transmitted is just as important as the technology that is used. To address this issue, it was recommended that 5 steps be followed: 1) Identify the problem you are trying to solve, 2) map out an *acceptable* solution, 3) identify potential communication bottlenecks, 4) assess what equipment is available, and 5) determine your available budget. With this information rational and effective decisions can be made.

Using T.120 Application Sharing For Remote Prosthetic Device Control

Lemaire ED, Fawcett J, Nielen D, Smith CS¹. Institute for Rehabilitation Research and Development, Ottawa, Ontario; ¹Smith Prosthetics Services Ltd.

Modern prosthetic devices are microprocessor controlled, and clients require frequent re-configuration of their devices. Telehealth offers a mechanism to accomplish this in a convenient

manner that also provides support for clients when travelling, as well as providing opportunities to gather feedback on gait parameters, and permit remote configuration and remote upgrade of devices. To assess the potential a pilot study examined the use of an Internet-based, desktop video and data conferencing solution for remote configuration of the Otto Bock C-Leg. The telehealth set-up used a desktop computer, PCI video capture card/camcorder or Polycom ViaVideo at the specialist site, a desktop computer or notebook computer and USB video capture or Polycom ViaVideo at the remote site, communicating using Netmeeting data conferencing.

This set-up was successfully trialed in three environments; on-site testing over a LAN, inter-city testing over a dial-up connection (20-28 Kbps, Toronto to Ottawa), and international test between Hong Kong and Ottawa via a high-speed connection. Issues were identified with screen refresh being insufficient (inter-city), and the multipoint conferencing server limiting speed (international), but overall each test was clinically successful.

The use of application sharing with live-video support was shown to be a clinically viable tool for remote assistive device configuration if sufficient Internet data transfer speed is available (over 120 Kbps upload). A clinical trial is required to advance this application further. Use with other computer-controlled devices and in other settings (e.g. developing countries) can be envisioned.

Screening for Diabetic Retinopathy in James Bay, Ontario: A Cost-Effectiveness Analysis

Maberley DAL¹, Walker H², Koushik A³, Cruess AF². ¹University of British Columbia, Vancouver, B.C., ²Queen's University, Kingston, Ontario; ³McGill University, Montreal, Quebec

Diabetic retinopathy is a common complication of diabetes that occurs asymptotically, but therapies are available for vision threatening stages. Canada's First Nation population has a higher prevalence of diabetes and is more geographically isolated than the broader Canadian population. Recently, retinal photography has emerged as a technology that may be able to replace ophthalmologist screening for this population. Photographic screening bears added expenses associated with equipment purchase, but has the potential of being operated by technicians in remote settings.

We performed a cost-effectiveness evaluation of two different diabetic retinopathy screening programs for the provision of retinal evaluations. The cohort of Cree individuals with diabetes from Western James Bay comprised the population of interest. The programs were compared on costs, visual outcomes, dollars per sight-year saved, quality-adjusted life years (QALYs), and dollars per QALY. Estimates were also made of the costs that would be associated with screening all isolated First Nations individuals with diabetes in Ontario.

From the perspective of the health care system, a mobile camera system was preferable to the present ophthalmologist-based program. Sixty-seven sight years were gained over 'no program' at a cost of \$3,900 per vision year and \$15,000 per QALY. Generalizing these results to the province of Ontario, a mobile camera system could allow most isolated First Nations people with diabetes to be screened for 5-years for approximately 1.2 million dollars.

A mobile, retinal photographic camera is a cost-effective means of providing screening for diabetic retinopathy in isolated cohorts of individuals.

Developing a Comprehensive Framework to Evaluate Telemedicine

Roston B¹, Goel V². ¹NORTH Network, Toronto, Ontario; ²University of Toronto, Toronto, Ontario

The authors present some challenges to evaluating telemedicine, providing examples of the lack of evidence of cost effectiveness and clinical benefits. Two phases are proposed for the development of a framework. The first is the use of questionnaires to patients, specialists, and referring physicians using non-standardized measurement indicators. Cost estimates should also be done, using operational not capital costs. The second phase poses the question: Where to begin? Program objectives should be reviewed and categorized as appropriate. Information is required on service delivery and health care delivery and specifically, there is the need to determine indicators.

This information will be found in 5 noted sources: existing internal reports, focus groups with staff /physicians/patients, existing data sets (baseline information), usage statistics, and questionnaires. The challenges to the development of an evaluation plan include access to databases, response rates, money, time, and the gold standard.

The recommendations are threefold: develop plans that go beyond patient and provider satisfaction, link program objectives to evaluation indicators, and a national consensus on core indicators for telemedicine evaluation would be valuable. The authors conclude that a comprehensive evaluation strategy will provide better understanding of the impact of telemedicine, and will address gaps in the body of knowledge. Furthermore, it will help to inform decisions on the role of telemedicine in the Canadian Health Care System.

Patient Attitudes toward Digital Video Records of Endoscopic Procedures

Rossos PG¹, Salenieks ME, Seto E¹, Cafazzo JA¹, Moser J¹, Neto C, King S. Centre for Global eHealth Innovation, Toronto, Ontario; ¹Medical Device Informatics

We conducted a survey to determine patient attitudes due to increased use of video endoscopy [and similar procedures] and the incorporation of this data into both the Electronic Health Record (EHR) and Telehealth consultation. There was a high response rate at 88%. Acceptance did not differ significantly with degree of computer use, age, gender, income, education, country of birth or first language spoken. There was however, a significant difference (p value of 0.03) among computer users and non-users in their level of personal information being stored on computers i.e., those who use computers had a higher degree of worry. The author indicated plans to pilot a tele-endoscopy project with a larger population over the NORTH Network using this technology developed at the University Health Network. The model presented could be used in future studies to determine baseline information to assess usage and implementation of Information and Communications technologies.

Using Case Study Methods to Evaluate e-Health

Siedlecki B, Jennett P, Graham R¹. Health Telematics Unit, University of Calgary, Calgary, Alberta; ¹Malloch Graham + Associates [Acknowledgements: Dr. Paula Pasquali, Joy Kajiwara]

The Case Study Method as an effective tool in evaluating e-Health. In its application to the Yukon evaluation project, the author described how the application of this methodology enriched the data gathered and helped to gain a more in-depth understanding of situations that impact the use of Telehealth e.g., scheduling appointments when other activities clearly took precedence in the community. Preliminary outcomes show a positive response; use varies; that this methodology focuses on local idiosyncrasies vs. global response; that it is useful in context of diverse populations but that while diverse methodologies enrich data, they complicate analysis. The case study model will supply the basis of building separate documents to support future policy decisions. Research process well planned and steps clearly identified.

Health Infostructure Atlantic – Lessons Learned For Telehealth Evaluation

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This topic focused on the evaluation approach, challenges and described lessons learned. The evaluation, built on CHIPP guidelines, was outsourced to an objective 3rd party consulting firm who used a pre-post design (opinion data) and performed extensive interviews of Radiology and related stakeholders. The lessons learned included the need to manage evaluation expectations such as what is measurable in the allocated time frame (expectations high); importance of mode of communication (found face-to-face meetings needed); need to address ethics review; to have a flexible evaluation schedule; to clear about the difference between quality management and evaluation activity; and to have all interfaces functioning before beginning training.

Health Infostructure Atlantic: Challenges with Interoperability

Ryan BR. Health Infostructure Atlantic, Halifax, Nova Scotia

The HIA initiative, challenges, solutions and lessons learned was fully described. The Health Infostructure Atlantic (HIA) was formed in 1999 with the mandate to collaborate on IT/IM initiatives in Atlantic Canada. The HIA vision is twofold: (1) to be a leader in promoting and adopting information and communication technologies, information products, and knowledge that improves the planning, delivery, management and monitoring of health and community-based services available to Atlantic Canadians and (2) through collaboration, HIA will support the priorities of the Council of Atlantic Premiers, while respecting individual provincial priorities, and remaining aligned with federal, provincial, and territorial health infostructure initiatives.

A fundamental challenge was the lack of Provincial and Atlantic unique patient identifiers. Working with multiple stakeholders and multiple vendors posed significant challenges as well as understanding the standards and infrastructure involved. One of the main lessons learned was the need to develop interoperability prior to implementation. Other lessons learned included: the need for testing transmission of data as well as to test based on differing scenarios; to involve experts in the standards being used available and involved; the relatively small incremental cost of connectivity that can make large gains in the system; and the need to ensure mechanisms for sustainability of the standard are identified.

Identifying Telehealth / e-Health Socio-Economic Indicators for Priority Health Areas

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This presentation focused on the questions “How does Telehealth (e-Health) modify the Social Determinants of health and how does it impact the socio-economic performance of a community?” The author referred to an interim report of the study indicating a scarcity of socio-policy investigation and indicators due to few programs deployed; economic/outcome investigations/indicators are available. Implications of the work include: need for a clear definition of Telehealth; need to make use of what we do know and respond to the gaps; to better identify and measure the social impact of Telehealth as the current information is very high level and minimal indicators are identified; and need to determine public preference. The need for quality studies and how to improve information sharing were identified due to many questions around the current methodologies. Barriers to implementation persist (and need to be resolved) in the areas of privacy & confidentiality and medico-legal issues e.g., cross border licensure.

The Development, Implementation and Evaluation of a Comprehensive Postpartum Telehomecare Program

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The only Randomized Controlled Trial reported in this section was conducted as a pilot study. The results indicated limited costs to the funding source and that the benefits exceeded the costs to operate the program. The presenter described this work as a pre-experimental case study with expected future applicability and potential for expansion across other programs.

Sustainability and Integration

Overview

Sustainable telehealth models require large-scale programs, market focus, a refined business model, alternative markets and applications, reimbursement plans, and partnerships. Industry in particular can move forward through partnerships and the creative application of technology with its clients. Conversely, it is critical that industry assesses, and is informed, regarding "readiness" to adopt, and implement technology, if markets are going to be successful.

Business success requires awareness of the telehealth application within its culture of use (the corporate / financial sector, the technical sector, and the human resource sector) and an intimate knowledge of user requirements, the system engineering design process, a validation test development process, and a test execution process. One study identified nearly 90 user requirements, which were categorized into eight groups: user-friendly technology, user acceptability, education, data management, privacy and confidentiality, system integrity, infrastructure and visual/audio requirement.

Another feature of business success is respect for the social, cultural, and economic issues. This is relevant within Canada, but particularly for developing countries where attention to these issues is required for marketing or commercialization success, as well as for collaborative research and partnership.

Growing business opportunities exist in such applications as the electronic health record, or in applications that involve the public. With every province and territory now "doing" telehealth, and with National applications as well, mainstream business opportunities have grown in such areas as standardized system architecture, equipment (edge devices and peripherals), new advanced network technologies and bridging technologies, change management, and training etc..

Individual Presentations

Developing Countries: Social, Cultural, and Economic Issues and Their Influence on Telehealth Research

Palacios M, Scott RE. Telehealth and e-Health Research and Training Program, Health Telematics Unit, Department of Community Health Sciences, Faculty of Medicine, University of Calgary.

Developing countries can benefit greatly from telehealth. Characteristics of developing countries reveal that there is an uneven distribution of specialists, limited medical expertise, difficult access to health centers, and transportation issues. Cultural, economic, and social issues in developing

countries are briefly mentioned. Telehealth research funding is a major issue. Collaborative research and partnership may be the best approach, but more importantly, developing countries must be included and respected as active partners.

The authors conclude that published formal research in developing countries is limited. Pilot projects are required in order to have evidence-based recommendations to inform policy making decisions. Cautious collaborative research and partnership best approach to successful financing and implementation of telehealth in developing countries.

Engaging The Public In Health Informatics - Whether, Why, Who, How, When?

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Questions regarding what role do/should/could consumers of health care play in moving the health informatics agenda forward, and whether or not this is a resource that needs to be harnessed are considered. Infoway's Pan-Canadian definition states that an Electronic Health Record (EHR) provides each individual in Canada with a secure and private lifetime record of their key health history and care within the health system. The record is available electronically to authorized health care providers and the individual anywhere, anytime in support of high quality care. A workshop held in Quebec City in June 2002 was intended to identify impediments and opportunities for advancing health information standards. Participants included administrators, health informatics leads, providers, vendors, politicians and bureaucrats, and consumers. After following up on all of the participant's perspectives, the authors conclude that the community of interest with the greatest likely impact for advancing the health informatics agenda generally, are consumers and patient advocates. To the best of our knowledge, this group is substantially, if not completely absent from the discussion.

East Meets West: Comparisons in Telehealth

Anglin CR¹, Ryan BR². ¹BC Telehealth Program Evaluation, University of Victoria, Victoria, British Columbia. ²Health Infostructure Atlantic, Halifax

The Canada Health Infostructure Partnerships Program (CHIPP) funded a number of Telehealth projects across Canada, offering the opportunity to gain insight through comparing and contrasting projects. Two projects were selected that were trans-jurisdictional in scope, had similar time frames, included an evaluation component, complied with CHIPP reporting requirements, and involved multiple stakeholders.

The British Columbia Telehealth Program established a multidisciplinary network of clinical, continuing education, administrative, and family visitation telehealth applications to link tertiary centers to and with regional health facilities that support primary and secondary health service delivery. Four of six health authorities participated. The total budget was approximately \$9 M.

Health Infostructure Atlantic (HIA) implemented Tele-i4 (inter-provincial integration of images and reports) across Atlantic Canada. This consisted of deploying specialised Picture Archiving and Communication Systems (PACS) in selected locations across Atlantic Canada, and connecting with existing provincial networks. The total budget was approximately \$13M. Further, networks were linked between regions and across provinces to support the usual patterns of referral and consultation across Atlantic Canada. It was expected the project would encourage development of interoperability standards and support future initiatives to develop an EHR, and the improved

capacity would assist with recruitment and retention of radiologists, and improve service to rural areas.

The two projects share important similar characteristics including similar geographic coverage; the size of the budget; the goal to support health care in rural regions through services that span many jurisdictions; and the need to establish sustainable telehealth services within a very constrained time frame. They differ in other respects, such as the explicit objective of integration with other networks for HIA and the independence of the BC Telehealth program from a number of other initiatives in this province; the spectrum and type of services; and the human (BC) versus technology (HIA) focus. They also differ in the insights gained, such as the advantage of using proven (HIA) versus unproven (BC) technology, and the likelihood of sustainability (high in HIA due to pre-existing teleradiology activity, less so for BC due to a need to redefine the workplace).

BC Telehealth Maternal-Child / Paediatric Palliative Care Program – Process and Impact

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The BC Telehealth Program is a CHIPP sponsored program implementing telehealth throughout British Columbia. It had two major components: ER/Trauma/CME and Maternal-Child Care /Paediatric Palliative Care (MCCPPC). We describe the implementation process for the MCC/PPC applications with a focus on the Community Development, Needs Assessment, and Design processes and lessons learned.

This presentation will describe the impact of CHIPP and Ministry of Health funding on the implementation of Telehealth in British Columbia. This funding enabled a project management approach to the multi-jurisdictional delivery of new telehealth services across BC. The approach included the definition of a standardized system architecture, extensive community consultation, team development, process design, validation and refinement.

The MCC/PPC program was founded upon the existing Telehealth program at Children's & Women's Health Centre of B.C. Seven clinical applications were identified through a Community Development process. Needs Assessment and Design brought together over 100 individuals (with a core group of 85 team members) in 12 organizations across 10 communities. Four Health Authorities were involved. This was successfully accomplished with an aggressive timeline. 104 pieces of equipment (edge devices and peripherals) and a new network were deployed. Telehealth implementation established or expanded programs in Cardiology, Child Development and Rehabilitation, Medical Genetics, Maternal Foetal Medicine, Neonatology, Nutrition Services, Oncology and Paediatric Palliative Care. Each of these in turn developed clinical, educational and administrative applications.

The presentation will also provide updated information regarding program activity, as of September 2002, and preliminary evaluation data is available.

Psychosocial Determinants of Telehealth Adoption by Physicians of the Quebec Child Telehealth Network (RQTE)

Gagnon M-P, Godin G, Fortin J-P, Gagné C. Université Laval, Sainte-Foy

The Quebec Child Telehealth Network (RQTE) is a provincial network in paediatric cardiology. The theoretical framework adopted for this project is adapted from Triandis, 1980. The framework is based on intention equals attitude, affect, social factors, personal normative beliefs, facilitating conditions, habit. The methodology reveals that questionnaires were sent to 3800 physicians, with a response rate of 14%. Descriptive data was extracted from the questionnaires, and multiple regressions were performed.

The psychosocial determinants of telehealth adoption indicate that telehealth is consistent with the physicians' professional role. Telehealth projects would benefit from an assessment of professionals' perceptions about telehealth. Organisational and professional factors affecting the integration of telehealth should also be investigated. It is also noted that telehealth adoption is mainly affected by human and social factors.

The Essence of Telehealth Readiness in Rural Communities: Factors and Challenges

Jennett PA¹, Bates J², Jackson ATK¹, Healy T³, Kazanjian A², Linn G², Ho K², Woollard R², Haydt SM¹. ¹Health Telematics Unit, University of Calgary, Calgary Alberta; ²University of British Columbia; ³University of Northern British Columbia

The purposes of this study were to construct the "essence" of telehealth "readiness" for rural communities, and to present a framework of telehealth "readiness" for rural and remote communities. Telehealth readiness is the degree to which a community is prepared to participate and succeed in telehealth. The communities of interest in the rural community are organizational, patient, public, and practitioner. Data analysis on 16 key informant interviews with experts, 2 awareness sessions with the community, and an additional 5 focus groups and 2 in-depth interviews in the community was done using a qualitative phenomenological approach.

The data analysis was divided into two parts, program theory and implementation theory in an effort to develop the program's theory of change. Program Theory is based on intangible factors and human reaction that will affect implementation that were identified in both KI interview and focus groups. Implementation Theory involves steps identified by key informants to implement a successful telehealth service.

Results show prominent themes found within the data focus around core readiness, assessment of risk, projection of benefits, structural readiness and responsiveness, education and awareness, and intra-group and inter-group dynamics.

Building a Sustainable Telehealth Model: Moving Industry Forward Through Partnerships and Creative Application of Technology.

Lowenstein S. March Networks, 555 Legget Drive - Tower B, Ottawa, Ontario

There is a need to emphasise partnerships, particularly with the private sector and clients. Reimbursement models must address the needs of public-private partnerships (P3's). To enhance the flexibility, performance, and usability of any e-health solution, a variety of technologies should be used. Solutions must be 'affordable' and project management expertise is essential. In addition, the focus must be on clinical outcomes, and not technology.

In an ideal world, telehealth applications would be integrated into existing processes. In the industry today, the benefits and potential are widely accepted for a range of applications and

services. Development tends to consist of small-scale pilot projects supported by grant funding. The barriers to sustainability include: applications and solutions with a narrow focus, reimbursement, and price points/business model. The author proposes building a sustainable telehealth model beginning with a market focus that seeks to broaden the focus to large scale programs to assess and prove systems impact, refine the business model, seek alternative markets and applications, and emphasize partnerships. A description is given of what each of the participants can do. Participants include policy makers, health care providers, industry associations, and technology solutions providers.

Creating a Culture of Use: The Key to Sustainability and Integration.

O'Neill SK, Reinbold DJ¹. Westview Regional Health Authority. Jasper, Alberta; ¹Mistahia Health Region, Grande Prairie, Alberta.

For any telehealth solution, it is essential to develop a 'culture of use'. A telehealth triangle exists between the corporate / financial sector, the technical sector and the human resources sector (this is key – in particular telehealth coordinator).

The goal of this presentation is to introduce the concept of "Creating a culture of use" as a key factor for the successful implementation of any telehealth project. Successful programs focus on ensuring that telehealth becomes an integrated methodology for delivering education and clinical services. We believe that telehealth project managers should focus early, and stay focused, on building a culture of use around their telehealth project.

The authors reviewed their experience with four separate telehealth initiatives coupled with a review of the Telehealth literature and identified three essential parameters common to most successful telehealth projects. The three parameters deal with Corporate / Financial issues, Technical issues and the Human Element of telehealth. The authors focus on the "Human Element" dimension and expand upon the steps that they took in order to foster a culture of use.

The author's respective telehealth projects are averaging over 500 hours of telehealth usage per month. We project this figure will increase significantly in the next 12 months when a further five planned sites are installed and more clinical and educational services are implemented via telehealth.

A large proportion of the project's success can be directly attributed to the culture of use that we have fostered.

A Cost-Benefit Analysis of In-House Multi-site Telehealth Bridging

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The authors conducted a cost benefit analysis of in house multisite bridging. Three regions in Alberta are considered. Multisite bridging allows for multiple videoconferencing or telehealth sites to engage in the same session, and it can bring together different telecommunications modalities (i.e. ISDN or Satellite). The study was conducted in order to examine the viability and functionality of internal bridging capabilities as a means of sustainability for the region's telehealth programs.

Three case studies are detailed and internal and external MCU (Multisite/point Control Unit) costs are compared within each case. In each case study, the internal costs are substantially lower than the external costs. For example, in a videoconference done between Red Deer, Hinton, and Grand Prairie, Alberta, the internal MCU charge was \$150 compared with the external cost of \$945.

The benefits of this service include the promotion of inter-regional cooperation, and that it allows for great user flexibility in scheduling MCU calls. The negative aspects of internal bridging are that extra telecommunications technologies are required and that there is no external technical support. The study concludes that internal multisite bridging is a cost effective method for providing multiple site telehealth session.

Confronting Assumptions: The Alberta First Nations Telehealth Project

Vigneault RD. Health Canada, Alberta First Nations TeleHealth Program FNIHB – Alberta Region, Edmonton, Alberta

The Alberta First Nations TeleHealth Project (AFNTP) has implemented telehealth systems in 21 Alberta First Nations communities to support a number of telehealth programs created to support on-going First Nations and Inuit Health Branch (FNIHB) initiatives focusing on addictions, diabetes prevention, tuberculosis, foetal alcohol syndrome (FAS), and nursing education.

Unlike other telehealth programs focused on the delivery of clinical programs, the AFNTP has chosen to develop a wellness network leveraging on established Health Canada programs in the hope that telehealth would readily gain acceptance that would lead to network stability and sustainability. The AFNTP has established a 'disposable' program with a clear mandate to facilitate the development of telehealth programs and to integrate these programs within mainstream telehealth delivery. The program office, intended to disband after a 4 year mandate, has also adopted a rigorous change management and training strategy aimed at educating all health centre workers in First Nations communities on the usage of equipment and to eliminate the dependency on regional or site telehealth coordinators.

The program is entering the second year of the mandate (first year of operations) and is in the process of evaluating utilization data in order to validate the appropriateness of the methodology in First Nations communities and may offer an alternative approach to the development of telehealth programs in underserved communities.

What Happens When the Grant Money is Gone?

Sutherland I. Telehealth Saskatchewan, Saskatoon, Saskatchewan

A brief history of telehealth in Saskatchewan is reviewed. This study focuses on the sustainability of telehealth mentioning specific ways sustainability can be maintained. First is to understand the purpose of your project. The goals of telehealth in Saskatchewan include improved access, to enhance rural practice, encourage optimal use of specialist personnel, provide continuing education for health care providers, patient, and the public, and to improve patient outcomes. Second, is planning which includes conducting a needs assessment and using appropriate technology at the lowest cost. Third, is sustainability with respect to people, that is, the right key people need to be recruited. Fourth is flexibility, which notes initial programs including child psychiatry and dermatology, as well as programs added such as paediatric general surgery. Sustainability also relates to integration with existing programs. Here, telehealth is the tool, and

not the program. Lastly is ministry support, which requires understanding what your Minister wants, and assembling evidence, such as external evaluations and public feedback.

The authors conclude that if the grant money is gone, then it is probably too late. Additionally, sustainability must be considered in the early processes of planning, and a project must build on what you think you can sustain.

Telehomecare User Requirements Elicitation

Brockway P, Ulmer R, Sargious P. Alberta Research Council, Calgary, Alberta,

Before system requirements can be determined, it is necessary to understand what user requirements exist. This is best done in a systematic manner termed a 'requirements elicitation process'. The process undertaken by the Telehealth Interoperability Laboratory to elicit the requirements of telehomecare users was described. The elicitation process is considered the first in a series of four steps to fully describe a telehomecare interoperability process. The remaining steps (not described) are a system engineering design process (technical requirements specification), a validation test development process, and a test execution process. To establish a baseline, telehomecare was defined as the use of information and technology to deliver homecare services and exchange information over geographical distances.

The methods are divided into two sections: telehomecare workflow and user requirements. Some of the questions asked of participants with respect to workflow include: With regard to a homecare visit, what steps do you go through before, during and after the visit? First for normal or base care, and secondly for telehealth care? As a provider/practitioner what do you like about these visit workflows? What do you not like? How is/are these workflows effective in providing health services? Results are reported in chart form.

The theme question asked for user requirements was: If you were to participate in a consultation in telehomecare, what would be the key components needed to make the consultation experience a success? Results identify key components such as: user-friendly technology, education, and integrity.

The focus group participants identified over 90 user requirements that could be categorised into eight groups: user-friendly technology, user acceptability, education, data management, privacy and confidentiality, system integrity, infrastructure and visual/audio requirements. A notable result was identification of the need to first perform a traditional base homecare visit before a telehomecare visit.

e-LEARNING

Overview

Of note was the small number of presentations related to e-learning, which experience has shown to be perhaps the biggest benefactor and user of e-health technology. The experience of both the industry and academic sectors should complement to provide a considerable resource that could move this area forward in a rapid and productive manner.

Individual Presentations

Construct .Net My Health Services for Health Information Awareness --- A Case Solution Based on Repetitive Strain Injury Prevention

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Computer users are at risk for repetitive strain injury (RSI), which can affect the entire upper body. The cost of RSI is substantial, and the authors' solution is to develop awareness and build preventative programs. Building a system for online health services information is suggested. Specifically, the proposed solution is to build .NET My Health Services by leveraging Microsoft .NET Services. .NET My Services are as follows: set of user-centric, XML web services to manage and protect personal information, it places users in control of their "personal networks", and it is a new way for service providers to reach customers with customers' permission.

RSI Free is a .NET My Health Service based on RSI prevention. The approach to RSI Free is that multimedia health awareness content will be created for an RSI prevention program. The salient features of the RSI Free solution include RSI preventative exercise to cover fingers, hands, arms, shoulders, neck and whole body, and chronological use data acquisition and self assessing. There are three noted benefits of the RSI Free and .NET My Health Services Solution. First, it is cost saving, as an entire health information awareness system does not need to be built from scratch (.NET Passports with Microsoft already exist and have about 200 million active accounts). Second, the target group already exists and is ready as the people who are already signed in with a .NET Passport are already extensive computer users. Finally, there is the benefit of global reach and scalability.

The ARC Learning Network: A Case Study of Learner-Derived Professional Development using Distance Learning

Aucoin R, Varnhagen S, Cook A, Liu L. Faculty of Rehabilitation, University of Alberta, Edmonton, Alberta

The authors report on data from a needs assessment conducted regarding the frustrations with continuous education in terms of travel, cost, time, and course. The needs of the professional associations, RHAs, employers, and educational institutions were identified and continuous education is a priority. It is a joint responsibility between educational institutions and private providers, associations, member and employers, an investment (as opposed to a cost), a method or recruitment and retention, a professional responsibility, and a mandatory requirement.

A pilot project was conducted to determine the feasibility and benefits of establishing a coordinating body (ARCLN) for implementing continuous education for rehabilitation service providers; and utilizing existing technologies to make various types of professional development content accessible to learners in Alberta and beyond. The pilot project concluded that it is effective.

ARCLN users reported that the information they learn in sessions helped them to improve their skills and enhance their practice. Respondents indicated (85%) that they expect to have to pay for their own continuing education, and most stated it was their responsibility to regularly take courses. It appears as though there is an increased emphasis on continuing education and its relative importance. The Alberta Health Professions' Act says that all health care professionals in Alberta will have to maintain professional competence. Continuing education will form a big part of that. There is also a belief that the responsibility for continuing education will be increasingly placed on the learners.

Utilising the Corporate Intranet to Enable e-Learning at AHSC

Kilfoil A, Palmer K. Atlantic Health Sciences Corporation, Saint John, New Brunswick

e-Learning at the Atlantic Health Sciences Region (AHSC) was introduced in 2000, and is a component of a larger Intranet strategy. There are currently 25 programs live which represent a combination of synchronous and asynchronous delivery. Programs are in areas such as: advanced nursing competencies, balance and stress reduction, presentation basics, and emergency codes. Goals of AHSC e-learning include the improvement of performance through high quality learning opportunities, equal access to learning across sites, and the integration of systems relationships. In an e-learning pilot looking at the interest in future e-learning, results indicate that 86% of respondents were either interested or highly interested.

Content development is discussed, and it is noted that all learning programs at AHSC are aligned with the business goals of the corporation. Making the decision about whether information will be delivered through e-learning or a classroom is done after a cost analysis has been done to determine which mode is most cost effective.

Five intranet dimensions of evaluation are detailed. They include: usability (i.e. utilization, accessibility), business value/outcomes (i.e. cost benefits, communications), culture (acceptance, satisfaction, readiness), technology, and support (help, training).

Framework for Continuing Professional Development for Physicians and Other Health Care Professionals: Lessons Learned

Lester R¹, Roston B¹, Williams R². ¹NORTH Network, Sunnybrook & Women's College Health Sciences Centre, Toronto, Ontario; ²Timmins and District Hospital, Ontario

The authors discuss the role of North Network, which is to provide infrastructure that facilitates delivery of education across distances. In order to get there, North Network seeks to establish education committees and facilitate face-to-face retreat. The study makes several conclusions: develop “culture of trust”, ongoing communication and planning, engaging other organizations to provide CPD, common needs assessment tool, common evaluation tool, engage government at provincial and federal levels, and engage the private sector. Recommendations indicate that planning should occur at the regional level using common needs assessments and evaluation tools, and that the provision of education should be regionally based as much as possible.

“Cross- Canada” Paediatric Sub-Specialty Rounds - Implementation and Evaluation

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The objectives of the videoconferencing grand rounds are to provide a forum for learning for health care for providers working in remote and under serviced areas, to reduce professional isolation, to reduce the need for travel for education, and to improve collegial relationships. Given that the drawback of grand rounds is the one-way flow of information, the goal is to use technology to maximize the interactive quality of videoconferencing to enhance the learning experience.

The factors for success with grand rounds are a single point of contact for program coordination, to maximize interaction, and to monitor and modify the program when required. Evaluation surveys were given out to determine effects of the interaction. Future plans are to use the evaluation tools to make systematic changes in tele-education, to evaluate the outcome of those changes, and to revise the evaluation survey.

Physicians’ Attitudes Toward Participating in Accredited CME Programs on the Internet (a Work-In-Progress)

Sargeant J¹, Allen M¹, Ferrier S¹, Curran V², Kirby F², Ho K³ and Selinger S³.
¹Dalhousie University, ²Memorial University, ³University of British Columbia

The purpose of this study is to understand physicians’ perceptions of participating in an accredited CME program on the Internet. The objectives of the study were to understand: what attracts physicians to participating in accredited online CME programs; barriers to their participation; value of participating in electronic discussions; barriers to participating in electronic discussions; ways to overcome barriers to participation and; the role physicians believe the Internet will play in formal CME in the future.

Based on grounded theory, data from focus groups and interviews (n=36 participants) was analyzed using an inductive approach looking for common themes and categories describing physicians’ attitudes and experiences. Following an initial analysis of results, some of the factors identified that attract physicians to interactive CME on the Internet include: convenience and ease of access, time and cost savings, and one can proceed at their own pace. In contrast, some of the barriers identified are the lack of social aspects of face-to-face CME events (some physicians prefer real time, verbal communication), and the difficulty of the technical learning curve.

TELEHOMECARE

Overview

Two presentations examined results of a telehomecare project completed at The Hospital for Sick Children & The University of Toronto. The investigators determined that many children's health care needs were not fully met by the existing community care system and children benefited greatly from care at home. The underlying telehomecare model was to enable higher intensity care at home and to address a barrier to care at home (e.g. frequency of care or geographic distance).

Examples of successes and challenges in implementing telehomecare were explored with a range of participants from seniors to children. It appears evident that telehomecare will be a focal point of activity for the immediate future.

Individual Presentations

Can Telehomecare Provide Quality Care for Children with Complex Care Needs?: Child & Family Outcomes

Dick PT, Bennie J, Young NL, and the Tele-HomeCare Project Group. The Hospital for Sick Children, Toronto, Ontario

The vision for telehomecare was to provide an integrated services approach that was built on existing services and would support the transition from hospital to home. The technology included an audiovisual connection between RN and patient. Their primary research questions related to changes in quality of life and satisfaction. 64 children participated in the study, ranging in age from 1 month to 14 years. The Quality of Life outcomes improved with discharge home on Tele-HomeCare. High levels of satisfaction were achieved through a difficult transition period using integrated Tele-HomeCare.

Geriatric Care: Key Factors For The Successful Use Of Customised Videoconferencing By Home-Bound Seniors

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Programs for Autonomy and Communication for the Elderly (PACE) is using videoconferencing to establish a virtual residential village, as a tool for intergenerational programs and for medical follow-up in seniors' homes allowing early hospital discharge. Videoconferencing was chosen as a medium because it could break down social isolation; promote intergenerational relationships; lower costs to the community; it was well suited to communicate emotions; and it promoted "safe

intimacy". System design included low cost PC's and TV's instead of monitors and a simplified user interface. The videoconferencing system has been installed for active seniors in homes and institutions as well as for frail seniors in institutions. 229 participants have been part of the project with more than 200 immigrants and high school, university and college students participating. Program successes include acceptance by frail seniors, no training or attending technicians required, participation of intergenerational coordinators, health related programs, participant loyalty to the program, providing benefits to seniors, immigrants and students. Challenges have included continuity lapses (e.g. funding, requirements to move equipment daily and volunteer turnover) and audio problems (e.g. sound control in larger rooms not a trivial problem). Return on investment areas include cost effectiveness of telehomecare, education of target users and public influencing local, provincial and federal governments; market growth for "tele-assisted" services for seniors will increase if tied to relationships they want and need.

Stakeholder Readiness for Telehomecare: Multiple Views of ROI

Hebert MA¹, Paquin MJ², Iversen S¹. ¹Health Telematics Unit, University of Calgary, Calgary, Alberta; ²Care in the Community – Home Care, Calgary Health Region

The objective of this study was to determine the readiness of clients, health care professionals and organizations to adopt telehomecare for adult diabetic clients within the Calgary Health Region. The study asked: " Compared to traditional care, how do stakeholders perceive the characteristics of telehomecare technology and its implementation in the CHR? A qualitative approach was used to collect data through focus groups with clients and homecare nurses and interviews with physicians and decision-makers. Data analyses were conducted using QSR software. Preliminary results included themes for each stakeholder group:

The clients were concerned about issues such as: who will pay for the technology and what is the value of the clinical care currently provided? The nurses raised the issues of: how to determine who are the appropriate clients and who will pay for the technology? The physicians wanted to know about the accuracy of the technology, remuneration issues, and client selection. The decision-makers wanted to know about the challenge of matching the right health care provider to the right patient at the right time and how the change in one service will affect others, such as ER and office visits.

The study concluded an evaluation framework could assist in demonstrating the influence of structure-process-outcome elements related to telehomecare and how changes in these affect quality of care.

Using Telemedicine To Manage Heart Failure Patients

McKee BR. Charleston Area Medical Center Institute, 3110 MacCorkle Avenue, SE, Charleston, West Virginia, USA

Project developers were interested in knowing whether home telemonitoring could provide a cost effective model in shifting heart failure (HF) patients from crisis care to chronic care by allowing clinicians to monitor patient conditions daily without requiring in-person visits. The primary project objectives were to determine if daily vital signs telemonitoring & early medical intervention reduced the cost of emergent care needs, incidence of emergent care needs and hospitalizations. The secondary objective was to determine if home telemonitoring improved patients' perceived quality of life. Patients selected for the study had moderate to severe heart failure. Their monitored time was evaluated against their own unmonitored time by comparing inpatient costs to

hospital admissions; outpatient costs to hospital (ER & clinic visits); and Quality of Life assessment. The study results demonstrated using telemedicine to manage patients with heart failure decreased ER visits and hospitalizations; identified cost savings; increased clinic visits with primary care provider; increased quality of life; and demonstrated more efficient use of resources.

Post Surgical Home Management by Telehealth

Siden HB¹, Young LE², Tredwell SJ¹, Payne CM¹. ¹University of British Columbia, Children's & Women's Health Centre of British Columbia, Vancouver, British Columbia; ²University of Victoria.

The clinical context for this study included 80 patients a year who undergo scoliosis correction surgery at Children's and Women's Health Centre of BC. Length of hospital stay has decreased by 50% over the past 10 years, which has shifted the extra burden of post-operative care from the hospital to home care by family members. A number of supports for early discharge are in place including education of family members to enable them to cope with the burden of care including telephone follow-up call on Day 3 post-discharge by the orthopaedic clinic nurse.

The clinical problem to be addressed by the study was the increased anxiety level for patients and families in response to early discharge and difficulties assessing patient's health status, wound appearance, etc. using telephone follow-up strategy. The study questions included: Was there: differences in outcome if image technology was used, improvements in post-operative assessment of surgical wounds, improvements in patient physical health and decreased anxiety for patients and families? Does the image technology affect other systems including: improvements in family health, decreased post-operative visits to clinic/emergency rooms/family physician, etc; communication including whether the content of videophone calls were richer in information than telephone?

The study hypothesized that there would be less resource use with the videophone. A 5% complication rate was assumed, which meant 50 participants would be needed for each arm. They discovered a lower complication rate was occurring which meant 130 participants would be needed per arm. A number of problems interfered with the success of the randomization scheme and only 21 and 22 patients/families were assigned to each study arm.

Both qualitative (e.g. nurse-patient conversation, family and health professional interviews, field notes) and quantitative data (e.g. patient demographics and clinical information, call logs, resource logs) were collected.

Preliminary qualitative themes included technology selectivity (videophone was the best selection for some families and telephone for others), inadequate pain management strategies and practice discontinuities (professional models for clinical practice shape the health care interaction and assessment frameworks may obscure or distract from key health related clinical data; lack of skill with the videophone technology can be a barrier to clinical practice).

A number of questions were identified, which may be followed up in a further study: Why is pain management problematic? How can doctors and nurses determine which families will benefit from a videophone intervention during the post-operative period? How can post-operative interviews with children and their families using technology be managed to optimize the health promoting potential of the interaction?

Paediatric Telehomecare: It's Value is not Monetary

Young NL, Barden W, McKeever P, Dick PT, and the Tele-HomeCare Project Group. The Hospital for Sick Children, Toronto, Ontario

The objective of qualitative portion of this study was to determine how patients and their families experienced telehomecare as a response to increased anxiety of patients and family resulting from early discharge. Fifty interviews were conducted pre-discharge from the hospital, in the home and when the study was completed. In the traditional care model, initial phone calls were made at day 2 or 3 post-op and difficulties were encountered when families attempted to describe wounds. The study investigated whether there was a difference in outcomes if the visits were made by videophones rather than through routine audio phone calls.

Several themes were identified across subjects and the 3 data collection time points. Key themes included physical, social and emotional factors that contribute to a “stable child” and “functional parent”. The model developed from the qualitative evaluation illustrated the net effect of telehomecare was “reunification of the family at home” which included relationships, routines and finances. Telehomecare provided valued support for the transition to community care for children with complex illnesses.

POLICY

Overview

These presentations reflect the wealth and variety of work being done, by academics and other groups, to create standards and guidelines, including policies at various levels and areas, for telehealth initiatives and the electronic health record. Industry needs to be demonstrating their use of standards and guidelines and their ability to address the issues raised from the various presentations in this section. The lack of inter-jurisdictional policy remains a barrier.

Due to the diversity of information that exists, the challenge within the industry will be to synthesize and adapt standards and guidelines that are meaningful to the various technologies and their applications. As well, the change process challenges are evident with the discussion of people needing to understand the commitment and adjustment in various areas, such as values alignment and system, operational, and legal issues. Indeed, success is not dependent solely upon technology, rather it is more dependent on the change process and buy-in; therefore, a critical activity for industry will be to influence the health system environment and create the social context needed for the implementation of telehealth initiatives. The lessons learned from training will be helpful to industry as it moves out with implementation, regardless of the technology.

Of note is that the issues raised in this policy section tend to be those from the provider lens, rather than the client/individual requiring health information and care.

Individual Presentations

The Development of a National Framework of Guidelines for Telehealth: Project Overview

Parker-Taillon D¹, Craddock T², MacDonald-Rencz S³, Pong R⁴, Jennett P⁵, Brockway P⁶, Finley J⁷. ¹National Initiative for Telehealth Guidelines, Ottawa, Ontario; ²The Keston Group; ³Canadian College of Health Service Executives; ⁴Centre for Rural and Northern Health Research; ⁵Health Telematics Program, University of Calgary; ⁶Alberta Research Council; ⁷Dalhousie University

The National Initiative for Telehealth Guidelines (NIFTE) is an independent multistakeholder, 20-month project. The primary project outcome is to develop a framework of national guidelines for: regulated health professional in developing their specific standards, telehealth provider organizations a benchmark for standard for service provision, and CCHSA in developing accreditation standards. The project further seeks to develop a national, interdisciplinary,

stakeholder groups as well as a sustainable network to facilitate on-going integrated multi-sector collaboration.

What are included in the scope of the project are activities related to rendering clinical services including, but not limited to, teleconsultation, teletriage, and telepharmacy. There are six project activities which are: development of a national interdisciplinary stakeholder network, an environmental scan, develop a framework of national guidelines, telehealth information to Canadian Council on Health Services Accreditation (CCHSA), create a database of key telehealth stakeholders, and the communication and dissemination of information. Expected outcomes are listed for each of the six project activities.

A Data Mining Model for The Ministry of Health Services

Jennings PH. Information Management Group, Ministry of Health Services, 1515 Blanshard St., Victoria, British Columbia

The draft model components include special considerations affecting health data, corporate data mining principles, recommended processes, structural components, organizational requirements, governance considerations, security approaches and roles and responsibilities of the participants. The draft model was designed to identify the critical components and the supporting processes and structures that would lead to the development of operational policies and procedures to effectively employ the technique of discovery analysis within the ministry.

The ABC's of Telehealth: The North Network Training Program for Telehealth Coordinators and Medical Directors

Nickoloff A, Fenton C, Sherrington L. NORTH Network, Sunnybrook and Women's College Health Sciences Centre, Toronto, Ontario

The North Network training program is a project that has facilitated the implementation of telehealth in over 60 sites in Ontario. The focus is on clinical consultation and professional education. The provision of training is one of the NORTH Network's core business services provided to its members. The target audiences for training were regional/tertiary coordinators, rural site coordinators, and rural site medical directors. Training objectives were to provide advice, guidance, opportunity, and information.

Convergence of Standards in Telehealth and the Electronic Health Record: So Much to be Done

Nusbaum, MH. M.H. Nusbaum & Associates Ltd., Victoria, British Columbia

The author discusses the differences between telehealth and electronic health records (EHR). Electronic health records are thought of as "...an active and distributed data source that can be accessed broadly, includes an individual's personal health information, all encounters & events, clinical decision support" (Health Canada). Telehealth is defined as "...the use of ICT to deliver health and health care services and information over large and small distances" (Industry Canada). Telehealth is about delivering health care services whereas electronic health records relates to documenting health care services.

Telehealth and electronic health records are thought to be in two different “camps”; however, the author proposes looking at the clinical content that may be similar between the two views. Examples of standards to consider and pilot projects are mentioned.

Policy and Peer Permission System Development Project: Development of User-Friendly Access Control Policy Statements for use with Electronic Health Records

Yeo M¹, Jennett PA¹, Matson M², Cheung S-T³. ¹Health Telematics Unit, Faculty of Medicine, University of Calgary, Calgary, Alberta; ²RightsMarket Inc.; ³University of Ottawa Heart Institute.

The Policy and Peer Permission (PPP) system automates the authoring and interpretation of policy for granting access to EHRs. Access control, which is an information security method, has two key objectives. It allows providers to access information about individuals, where consented, in a timely and efficient manner. Additionally, it prevents providers from accessing information they do not have authority to access. The purpose of the PPP policy development is to develop a “starter set” of workable policy statements for use with electronic health records systems in clinical practice with the RightsEnforcer software.

Several issues are examined in terms of access control issues. For example, the question arises over whether or not there should be broad or more controlled access, and the impact of implementing access control policies that would involve changes in the way things are done. There is also the problem of human behaviour as a security threat, which may be intentional, accidental, or inadvertent. User acceptance of the technology must also be considered as does translating policies. The tailoring of policy statements is being considered as PPP policy statements are being developed as a series of Scenarios that are tailored around: specific health sites involved, physician referral, consulting and communication patterns, staff information sharing patterns in everyday clinical practice, and organizational readiness and change management.

The Development of a National Framework of Guidelines for Telehealth: Environmental Scan

Pong R¹, Jennett P², Brockway P³, Finley J⁴, Yeo M², Hogenbirk J¹, Bryne K¹, Szpilfogel C⁴, Parker-Taillon D⁵, Sherman R⁵, Heath S⁴. ¹Centre for Rural and Northern Health Research, Laurentian University, Sudbury, Ontario; ²Health Telematics Program, University of Calgary; ³Alberta Research Council, Calgary; ⁴Dalhousie University, Halifax; ⁵National Initiative for Telehealth Guidelines, Ottawa.

In terms of the environmental scan for NIFTE, a literature review was performed to identify key issues that need to be explored on the environmental scan survey, and to collect information on the current status of policies, guidelines and standards as they related to telehealth practices in Canada. A NIFTE questionnaire and key informant interviews will be conducted.

There are four environmental scan content areas: organizational leadership, technology and equipment, clinical standards and outcomes, and human resources. The current status of the project is reported, as are some preliminary findings. Some of those findings include: the lack of

consensus in the development process due to many technologies and specialties involved, and the need to systematically assess an organization's telehealth readiness.

International Partnership to Advance Telehealth Standards and Guidelines

Ulmer R¹, Corley J², Craddock T³, Brockway P¹, Sargious P¹; ¹Alberta Research Council, Calgary, Alberta; ²Advanced Technology Group; ³Keston Group

A recent partnership between the Alberta Research Council (ARC) Telehealth Interoperability Laboratory and the US based Advanced Technology Institute (ATI) Telehealth Deployment Research Testbed (TDRT) is designed to advance the international telehealth industry and related services through enhancing interoperability. This partnership is predicated on the principle that sustainability of the telehealth industry will depend on system interoperability to increase marketability for manufacturers and versatility for consumers.

ARC is leading the development of telehealth interoperability standards on behalf of Canada for the International Organization for Standardization (ISO). Two documents have been put forth for international balloting; a technical report defining telehealth and a technical specification for telelearning. The Telelearning Technical Specification was developed based on the needs of healthcare instructors and learners, through user requirements elicitation. It proposes the technologies necessary for telelearning to support and deliver distance learning. A significant component of the TDRT effort is a "consumer report" on telehealth technology, aimed at providing information needed to select the appropriate technology for a healthcare application. TDRT evaluations are conducted both in the laboratory and real-world situations, focusing on individual technologies and interoperability between them. The first TDRT guidelines are for telehomecare.

Telehealth Policy in Select East Asian Countries: Implications for Policy Complementarity

Varghese SA, Scott RE. Telehealth and e-Health Research and Training Program, Health Telematics Unit, Faculty of Medicine, University of Calgary

The authors present a categorization scheme for telehealth policy in East Asia, and discuss the implications for complementarity of policy development globally. Some of the problems with health care in developing countries include the low number of health care professionals, and the rural-urban divide. Telehealth would offer benefits of improved quality of care, reduced costs, universal access, increased employment, and investment opportunities. East Asian countries are examined in terms of whether they have none, reactive, or proactive national policy/support.

It is concluded that policy complementarity is not occurring. There are no sustained and institutionalized interactions, and no interrelated and equal network of actors. Additionally, policy complementarity is unlikely as there is no ideal policy regime, and policy is rooted in existing development objectives and healthcare system.

The Certification Process for Community Telehealth Coordinators in First Nations Communities

Williams D. Keewaytinook Okimakanak Telehealth, Balmertown, Ontario

Keewayintook Okimakanak (KO) is a pilot project to develop effective telemedicine services in five remote Ontario First Nations Communities. Due to difficulty with retention and workload, the KO Telehealth Program is staffed with community members.

The Community Telehealth Coordinators (CTC) require special training to obtain the skills necessary for communication between health professionals. A number of suggestions for teaching CTCs are given by the former teacher. For those who are learning, English is often a second language. The CTCs respond best to simple direct language, and they learn best by doing or demonstrating. Expect to take technology instruction slowly and to understand that terms that are common to those of us who work with technology, are completely foreign to others.

The certification process involves: Computer Skills Checklist, Technical Training for the Telehealth Workstation, Health Skills Checklist, Medical Curriculum and Physical Assessment, Aboriginal Language Proficiency and Words for Translation Scheduling Information, Mock Sessions, and Community Promotion of Telehealth.

A number of lessons learned conclude the presentation. Computer training is a priority, as is the flow of communication between nurses. Onsite training is essential and should be supported with weekly teleconferences.

Underappreciated Barriers to Implementation of Telehealth Initiatives

Ho K¹, Karlinsky H¹, Bates J¹, Dunn G². ¹Faculty of Medicine, University of British Columbia; ²Gary Dunn & Associates, Computer and Technology Law.

The authors raise issues in four domains that are subtle, yet highly influential to the success or failure of a telehealth program. They include differences in values, system's issues, operational issues, and legal issues. Problems that may arise in terms of different values between members working on the project include the team members having different perceptions of time, or being more committed to other aspects of their work. Having a shared vision, getting time commitments on the table, and being clear about the importance of timing may prevent problems.

System's issues include such things as flexibility and inter-professional safety. Operational issues are under-appreciated barriers like naming the program and who is going to pay for it. Finally, legal issues indicate privacy for patients and credentialing of professionals, as well as risk management. All four of these subtle, yet very important issues, are essential to the success of any telehealth program.

Policy – Friend or Foe to ‘e-Health For All’ ?

Scott RE, Jennett PA. Telehealth and e-Health Research and Training Program, Health Telematics Unit, Faculty of Medicine, University of Calgary

The purpose of this study is to compare and contrast e-health policy in Canada and Malaysia, to identify strengths and weaknesses, and to propose policy directions and options. Global e-Health can be thought of as “the sustainable global integration of information and communications technologies into the practice of protecting and promoting health across geo-political, socio-economic, cultural, and temporal barriers - including research and education - to facilitate health, public and community health, health systems development, and epidemiology.”

In a comparison of Malaysia and Canada, both countries' e-health is a strategic issue, but only Malaysia has a clear long-term plan. With respect to e-health policy, Malaysia has several laws, many regulations, integrated, comprehensive, potentially restrictive. Coincidental laws, few regulations, a lack of integration, a lack of comprehensiveness, and too little guidance characterize Canada's e-health policy. In conclusion, policy can be both a friend and foe to global e-health. Policy directions should follow the path of awareness, education, and coordination.

Achieving Interoperable e-Health using a Common Conceptual Model

Paterson G¹, Parker R². ¹Saskatoon District Health, Saskatoon, Saskatchewan;
²AdActus Care Technologies.

The Conceptual Health Data Model (CHDM) represents a broad perspective of what data is relevant to the health of persons, groups of people, and populations. It is a framework for consistent, flexible, comprehensive capture of data about the health of people and the provision of services. The essence and key to the success of ROI for e-health initiatives is interoperability, which has three major elements: systems, standards, and organizations. The question focused on is how we use the tools inherent in the Conceptual Health Model to negotiate organizational interoperability. Achieving interoperability requires achieving shared understanding of the key things we wish to exchange information about. Using a shared conceptual model can facilitate this understanding.

A Conceptual Level Model refines the subjects in the contextual model, adding relationships to other entities that are required to fully understand each subject. The purpose of this level is to clarify the relationships among the major entities and to add enough qualifying detail to be able to distinguish each entity from all others. In summary, the use of the conceptual model provides an excellent methodology to facilitate discussion and alignment in all aspects of the health system. It can be used as a bridge to establish commonality. It can align through the development of shared meaning, processes and vocabulary. It can be used to design many key elements required for successful e-Health implementations and achieving the success and ROI we are all looking for.

RETURN ON INVESTMENT

Overview

The theme for this year's conference! From these presentations it is evident that we still lack a clear understanding of what constitutes 'return on investment', and how exactly to 'calculate' it. Indeed, it was noted that the ROI seen is dependent upon the analysis applied. The need for sound business case based decisions regarding e-health implementation was noted. Industry has experience to share in this regard, but will have to refocus their view to that of the healthcare sector. Although the need for a standard business case was identified, no such tool exists.

A novel perspective was offered in suggesting that ROI was related to trust. The message that ROI extends well beyond financial considerations was clear, and that silo thinking / silo funding continues to plague attempts to clarify the ROI issue.

Individual Presentations

Making the Telehealth Business Case

Chisholm MR, Palmer K. Atlantic Health Sciences Corporation, Saint John, New Brunswick

In the current health care environment there is competition for available dollars, aging patients and providers, and a shortage of health care professionals. Telehealth may help, but it requires a long-term view to recoup infrastructure investment. In terms of a business case, the ROI in health is more than merely financial. The authors propose that the key elements of the business case are to address stakeholders needs, to take a provincial/system view, address finances and sustainability, access, acceptability, and quality, all with the goal of making it easy to approve. The authors conclude that telehealth innovators have the knowledge and need to put it into a business case in order to get what they need.

A Case for a Telehealth Business Case

Gebran J, Haney JR. Department of Telehealth and Simulation, Capital Health Authority, Edmonton, Alberta

Capital Health is one of the largest integrated academic health service organizations in Canada. The author looks at how to prioritize new applications and how to evaluate them. A corporate steering committee should review and recommend for approval all new applications. A standard business case approach and rating tool should be developed and a commitment needs to be made for evaluation and ROI.

The project definition entails a problem statement and its goals and objectives. The problem statement is that “the current treatment and follow-up procedures require periodic patient travel to Edmonton and physician travel to rural communities. Since these visits are difficult for some patients to facilitate, their quality of care is compromised. Distance and travel also limits the support and educational offerings available to nursing staff in the satellite facilities...”. The goals and objectives seek to improve access to renal specialists, enhance communication between health care providers and patients, enhance staff education, increase patient satisfaction, and decrease costs.

Value Nets: Applications in e-Health

Igras E. IRIS Systems, Inc., Calgary, Alberta

A value net is a business design that uses digital supply concepts to achieve both customer satisfaction and company profitability. Value nets are customer aligned, collaborative, agile and scaleable, fast flow oriented, and digital. The value net components include value proposition (what), scope (what activities, who performs them, and how), profit capture (focuses on profit generation), strategic control (sustain profit stream), and execution (make the other elements work). Each one of these components is examined in detail. It is concluded that value nets assist in translating concepts into practical and sustainable solutions. They use concepts of value, and value creation to develop solutions that meet stakeholders' needs. Value nets offer a new and pragmatic tool to design and deploy e health services.

Modeling e-Risk: For Persistent Security the ROI is Trust

Matson M. RightsMarket Inc., Calgary, Alberta

The issue of security with the use of EMRs (Electronic Medical Records) is a top priority. Some scenarios for the need to use EMR would be if a hospital sends discharge reports to a physician, or if a physician e-mails EMR to a specialist for consultation. Three types of security are mentioned: repository, channel, and persistent security. Some examples of risks include an information accident at the client site or with the server, when a hacker deliberately breaks into the system, or with a legitimate user gone bad.

ROI is Trust. Privacy violations will always happen, but the right technology greatly reduces those violations. Persistent security reduces risk, and trust enables that the right information gets to the right person at the right time.

Managing a Project with Return On Investment (ROI) in Mind: Mission Impossible?

Robichaud S. Beauséjour Regional Health Authority, Moncton, New Brunswick

A CHIPP funded project has developed an efficient, comprehensive system for screening of cervical cancer in NB to reduce the incidence and mortality rate of the disease. Fifteen screening clinics were established in four participating regions, and a central registry allowed users to analyze useful and pertinent patient information. As of June 28th 2002, approximately 650 Pap tests were performed in the clinics, most of which opened between January and May 2002. A comparison between the number of Pap tests done in one region this year with those of the previous year, shows a significant increase in the recruitment of women. The project has significant ROI for patients, but economic ROI is elusive.

Telecare and e-Learning: Comparative Return on Investment in Mental Health

Somers JM, Queree, ML, Coyle, JW. Centre for Telehealth @ Mheccu, University of British Columbia, Vancouver, British Columbia

The field of mental health has been an early, and frequent adopter of distance technologies. ROI is presented based on results of a systematic review of mental health reports, indicating the magnitude and type of return evidenced by the available literature. Current research on telecare and e-learning in British Columbia is also presented in relation to ROI, adding additional quantitative and qualitative information to the foregoing analyses. The authors illustrate ways in which telecare and e-learning can be compared through ROI (e.g., reduced burden of illness), and ways in which they are not comparable (e.g., community capacity building). A further objective looks at framing the issue of ROI in a way that assists policy and decision-makers as they appraise different potential applications of e-health in mental health.

The study concluded that there is compelling empirical and pragmatic support for both telecare and e-learning. Both promise efficiencies, but of different kinds, with different methods of analysis. Investigators and proponents of telehealth must shape discussion of “worth” and “value”, and go beyond “ROI”, to develop economic rationales that fit local priorities, in appropriate units.

TECHNOLOGY DEVELOPMENT

Overview

Presentations focused on the use of IP and wireless technology, both seen as the way forward, and value judgements in regard to technology.

This session is intended to be a vehicle for industry to demonstrate its prowess in supporting the e-health sector. Industry needs to participate more actively in fora such as this, and share their visions for hardware and software solutions for the immediate and distant future. Such an approach would be welcome, exciting, and valuable for the telehealth community.

Individual Presentations

IP Technology – Is it Worth the Cost?

Sutherland I. Telehealth Saskatchewan, Saskatoon, Saskatchewan

A brief history of Telehealth in Saskatchewan is reviewed along with the current and proposed communication technology. Proof of concept and CommunityNet is detailed. SHIN technical issues and costs are identified. The options for Telehealth Saskatchewan are threefold: continue to use SaskTel for ISDN and SW56 and use Telus for bridge service, use CommunityNet as communications carrier and Telus for bridge, use CommunityNet (IP) as communication carrier and bridge provider.

e-Technology Utilisation as Value Creation in Integrated Systems: A Multi-Level Analysis using Role Theory

Taylor LK¹, Dubé L¹, Pinsonneault A¹, Tamblyn R². ¹Faculty of Management, Montreal, Quebec; ²Faculty of Medicine, McGill University

The purpose of this discussion was to describe a conceptual framework for value creation via technology introduction in integrated systems. An application context is presented for physician, pharmacist, and patient. Conceptual models are also discussed. The authors make three concluding points: (1) value creation is inversely related to role ambiguity and conflict, (2) the greater the pressure for change, the greater the potential for value, to optimize anticipated outcomes, and (3) technology introduction must be integrated into role identities.

The Web Integration of a Decision Support System Tools for Clinical Applications

Belacel N¹, Matthews B². ¹National Research Council (NRC), Institute for Information and Technology-e-business, e-health group, Saint John, New Brunswick; ²NRC Fredericton.

Reasons for using the Internet, along with its benefits are discussed. In terms of system architecture the developed system will help to: make virtual diagnosis using fuzzy multi-criteria assignment method; compare the performances given by the assignment method with human practitioners of medicine; implement a platform neutral XML framework for the electronic exchange of clinical data; assist online learning and simulation for training practitioners, and provide a secure environment to ensure that health data transactions can occur with trust, confidentiality and integrity.

The possibility of using virtual diagnosis using the PROAFTN method involves multi-criteria decision analysis, fuzzy sets, and supervised learning. PROAFTN is beneficial because it provides some information to the clinician by indicating whether the case is strongly or weakly assigned to the class. It also offers the possibility to modify the parameters of the prototypes. It is concluded that PROAFTN gives a good efficiency on acute leukemia application, and it can be extended to other types of pathologies.

Tele-Health and Wireless Technology – Bridging the Demand of Excellent Care and Lower Operating Costs

Posehn, W. Wi-LAN Inc., Calgary, Alberta

There is an ever-increasing demand for high-speed data access, particularly as a demand in health care. Innovative healthcare enterprises are embracing the Internet and other technologies to reach new markets, increase revenue and lower costs. One of the most exciting last mile technologies is Broadband Wireless, which uses wireless radio technology. A broadband wireless network gives healthcare organizations high-performance building-to-building connectivity needed to do more with less. There are multiple benefits to going wireless, which include simplicity and flexibility, the speed and reach (urban or rural) of wireless links, reliability and security, and economy and pricing. Compared with a wired network, a wireless network is faster to install, has more flexible deployment, has a scaleable network with no monthly fees, and has a low total cost of ownership.

A broadband wireless access summary reveals that wireless links are ideal for connecting multiple buildings together, either within hospital environments or remote clinics.