A pan-Canadian Health Informatics Education Strategy

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ABSTRACT

Despite the fact that health informatics (HI) educational opportunities in Canada have increased by 40% over the last 3 years, there are few opportunities for advanced research or credentialing at the MSc and PhD levels. Existing programs are also not easily accessible to working health care professionals, who require flexible, non-traditional delivery options for basic to advanced HI training. This strategy report proposes an overall vision, 3 goals, 4 tactical initiatives and a set of action items to improve the effectiveness of HI education in Canada.

BACKGROUND

The Advisory Committee on Health Infostructure (ACHI) was established in 1999 as a federal, provincial and territorial (F/P/T) mechanism to develop national strategies aimed at enhancing the utility and use of information and information and communications technology (ICT) within the health sector in Canada. The ACHI provides advice to the F/P/T Conference of Deputy Ministers of Health on the development and implementation of the pan-Canadian health infostructure, which is the evolving information and communication foundation for the Canadian health care system. The ACHI Tactical Plan (2001 Update[1]) outlines the strategic first steps that F/P/T jurisdictions agreed were needed to implement the pan-Canadian health infostructure. These steps consist of 8 recommendations and 22 action items related to 3 tactical initiatives: Electronic Health Records and Telehealth, Integrated Provider Solutions, and Health Information for the Public.

These initiatives are to bring major changes in the way health care services are accessed, delivered, and managed. Therefore, a comprehensive strategy is needed to help health care professionals transition to this new way of doing business. Recommendation 8.0 of the ACHI tactical plan addresses this need for a change management plan, and action item 3 specifically identifies HI education as a key enabler of these changes. Action item 3 also suggests 2 areas of emphasis for an HI education strategy: (a) enhancing the HI curricula of Canadian clinical training programs, such as nursing, medicine and pharmacy; (b) creating innovative HI educational options, such as online programs accessible to practicing providers.

Until recently there were few opportunities to pursue basic HI training or advanced HI education and research in Canada. Within the last three years the number of HI educational opportunities in Canada has increased from 31 to 50. Even so, most of these opportunities are not easily accessible to working health care professionals. To better understand how to use HI education as a catalyst for change, the Office of Health and the Information Highway (OHIH) at Health Canada and the School of Health Information Science (HINF) at the University of Victoria (UVic) partnered in an initiative to develop a pan-Canadian HI education strategy in the spring of 2002. The initiative consisted of these activities: (a) a face-to-face consultation with key stakeholders across Canada; (b) a survey and analysis of existing HI programs in Canada; (c) an environmental scan of current demand for HI competencies in Canada; (d) the development of strategy with a vision, goals, tactical initiatives and action items. The key results from this initiative are summarized in this report.

STAKEHOLDER CONSULTATIONS

2-Day Summit - OHIH and UVic jointly hosted a summit in May 2002 to gain input from key stakeholders on a pan-Canadian strategy for HI education. A total of 32 participants took part with representation from: 1 provincial ministry, 14 educational institutions, 10 professional associations and colleges, 5 health agencies and working groups, and 2 health regions. At the summit, participants identified 6 key issues that represent major challenges for advancing HI education as a catalyst for change within the current health care system. These are:

- Consensus is needed on a Canadian definition of HI so that it is relevant to, and understood by, practitioners, administrators, educators, consumers and policy makers.
- Funding and incentives are needed to support HI in education and training programs, and in practice from local to national levels.
- Coherence, standards, organizational structures, linkages and partnerships are needed for health information and HI at all levels.
- There is a need to clearly identify the demand for a blend of health and IT knowledge and skills, as well as the need for HI specialists.

- Advanced HI research programs are needed to develop an evidence base so that health care professionals will implement and use health informatics solutions.
- There is a need for leadership and collaboration at the F/P/T level to move the agenda forward.

Suggested Actions - The participants recommended 6 action items for implementation over the next 6 to 12 months as the first steps in a pan-Canadian approach to HI education and change management:

- *Establish HI funding and incentives* – identify funding sources, establish goals of the national HI research agenda, increase HI adoption, improve output, and demonstrate values.
- *Establish comprehensive HI education and training programs* – articulate HI definition and competencies, identify incentives, and provide continuing education.
- *Nurture HI champions/leaders to influence change* – identify, promote and nurture HI leaders and champions; identify sponsors and mentors, and reward proactive advocacy.
- *Promote organizational change to embrace HI* – develop policy/regulatory framework for HI, develop business case, reward success, identify best practices, ensure user participation, include training and project evaluation.
- *Build HI competency in organizations* – influence licensing/accreditation bodies, recognize HI credentials and competencies, support collaboration with HI, link with related initiatives such as primary care, technology assessment.
- *Move HI agenda forward* – produce and distribute action plan, identify sponsors, leverage opportunities, and establish a virtual HI community.

EXISTING HI PROGRAMS

Current Supply – An extensive web search identified 50 HI educational opportunities in Canada. Adjusting for one Master level program that has been discontinued and one professional development program that is U.S. based, the remaining 48 opportunities are distributed as follows: (a) 10 graduate programs, 8 certificate/diploma programs, 8 undergraduate programs, 6 health records programs, 5 professional development programs, and 11 assorted courses/sessions; (b) 19 or 40% of these HI opportunities are less than four years old and funding ends in 2002 for two demonstration projects - one certificate and one professional development; (c) Access to most HI educational opportunities in Canada is limited by geography, and there is a noticeable lack of distance and/or online programs in all categories other than certificates and diplomas. Undergraduate degrees are typically targeted at full-time students, not working professionals, therefore it is not unusual that there are no distance programs in this category.

Key Challenges - 24 Canadian HI programs participated in a survey to assess the challeges faced by the HI academic community and to establish the enrollment trend for Canadian HI programs. Because many new programs participated in the survey it was difficult to determine enrollment trend. However, established programs indicated a steady or increasing demand. The survey participants shared many similar challenges, which fall into three broad categories: marketing, curriculum, funding. Marketing challenges include the challenges of promoting their programs and demonstrating the importance of HI to sponsoring employers, potential students, and funding and granting agencies. Curriculum challenges include rapid changes in technology and information management techniques, keeping course content and faculty members current, and balancing the knowledge areas and skill sets that must be taught in a limited number of courses; it also includes the challenges of recruiting qualified instructors, developing high quality courses for advanced students and working professionals, and finding suitable Canadian textbooks. The fundamental challenge identified by participants was funding. This issue affects their ability to overcome almost all other challenges. For example, funding issues are limiting the ability of those surveyed to sustain pilot programs, to hire new faculty or instructors, and to offer new courses or programs or to increase enrollment.

Breadth and Depth - An analysis of existing HI curricula in Canada was carried out to determine if there are any significant gaps in the depth and breadth of programs currently offered by Canadian educational institutions. All together, 21 programs were included in the analysis, and they were grouped into four categories: 7 undergraduate degree programs; 4 graduate degree programs; 5 certificate and diploma programs; 5 health record programs. The curricula of these programs were compared to a Canadian HI curriculum model.[2] Where individual programs had content gaps, these gaps were reduced or eliminated by analyzing these programs in groups. Assessed in this way, all major curriculum areas are covered by existing Canadian HI programs. The conclusion is that a coordinated effort to offer existing courses across multiple educational institutions using flexible delivery options is one way to address curriculum gaps in individual programs without having to develop new courses at each institution.

DEMAND FOR HI COMPETENCY

Target Groups - To better understand the need for HI competencies today and in the future, an environmental scan was conducted during June and July 2002. The following groups were invited to share their perspectives on the need for HI training, advanced education, and research opportunities in Canada: (a) Professional associations and colleges (23 e-mail responses); (b) Health-IT executives (4 telephone interviews); (c) UVic-HINF alumni (95 completed surveys); (d) Health care professionals (14 written testimonials). Our findings suggested the demand for HI competencies are in three areas: graduate degrees, advanced research opportunities, and basic HI training.

Graduate Degrees - The lack of graduate programs with flexible delivery options was a common concern expressed by respondents. As one registered nurse said: *"I have a job and family . . . so having to move out of Province to complete my education is not convenient and, because of my custody arrangements regarding my children, not an option unless I leave them behind. I also want to be able to complete my Masters on a part time basis so that I don't have to leave the work force."* Similarly, a physician reflected: *"It is crucial . . .to have the flexibility that would allow those who are interested to pursue a degree or certificate in a way that would minimally disrupt their clinical life. Patients almost always come first for doctors and there needs to be a way of improving knowledge base without closing the office doors for two years."* One of the key advantages of flexible delivery options like part-time studies and distance education is employee retention. Specifically, employees can gain the knowledge they need to advance their careers without leaving the workforce. This is particularly important in health care because of the national shortages Canada is experiencing in many health care disciplines, such as nursing and medicine.

Advanced Research Opportunities - Many respondents also expressed concern about the lack of HI-specific research opportunities in Canada. The reason for this concern is two-fold: first, the absence of HI-specific PhD programs is limiting the pool of potential HI faculty in Canada; and second, health care professionals who are seeking advanced research opportunities in HI frequently leave Canada to pursue their interests. Respondents made it clear that universities in the United States are servicing the Canadian demand for advanced research opportunities in HI. Because it may be difficult to repatriate these professionals, attention should be focussed on ways to prevent them from leaving in the first place. For example, one expatriate currently taking a PhD in medical informatics at Stanford University suggested that financial incentives be established for Canadian universities similar to the extramural grant program from the National Library of Medicine (NLM) in the United States. The NLM grant program currently funds pre-doctoral and postdoctoral HI research at 18 universities in US.

Basic HI Training - In spite of the apparent abundance of basic HI training opportunities in Canada (19 in total), most are not available by distance and/or online delivery, 2 require a background in nursing, 1 requires a background in medicine, and 2 programs (representing a total of 15 courses) will run out of funding this year. Perhaps because of these limitations most respondents agreed that more basic HI training opportunities are needed. Professional associations and colleges in particular felt that their memberships would need access to basic HI training in order to make the most use of: telehealth (for distance education, providing clinical advice from remote locations, and for delivering information to consumers); electronic health records (EHR); evidence-based decision making; electronic communications; electronic billing; computerized patient care/patient safety systems, and computerized physician order entry (CPOE). Some professional associations and colleges are communicating the importance health informatics to their memberships in these ways:

- **Canadian Association of Occupational Therapists** - recently published the second edition (2002) of their *Profile of Occupational Therapy Practice in Canada*, describing the practice of occupational therapy including HI competencies.
- **Canadian Dental Hygienist Association** – outlines how information technology is to be integrated into the practice of dental hygiene in two publications: *Dental Hygiene: Definition, Scope, and Practice, and Standards Task Force of Dental Hygiene Education Report to the CDHA Board of Directors (2000).*
- **Canadian Medical Association** – has recently identified electronic service delivery as one of six key priority areas.
- **Ontario College of Family Physicians** – states that its members will need education to support their use of technology in their report *Ensuring Success for Ontario's Family Health Network – Leadership, Innovation, Accountability and Connectivity in Family Medicine (2001)*.
- **Royal College of Physicians and Surgeons of Canada** – defines in their report *Skills for the New Millennium (1996)* one of the roles of the specialist physician manager as utilizing

information technology to optimize patient care, life-long learning and other activities.

- **Canadian College of Health Service Executives** – is influencing the development of essential HI skills among its membership by updating the competency requirements for the *Certified Health Executive* designation to include a requirement for minimum knowledge and experience with electronic health information systems.

HI EDUCATION STRATEGY

Based on results of the stakeholder consultation, survey on existing HI education programs and identified demand for HI competencies, a pan-Canadian HI education strategy was developed. The strategy consists of a vision, 3 goals, 4 tactical initiatives, and a set of action items to be implemented over 3-5 years. Specifically:

Vision – *"A health care workforce with the knowledge and skills to effectively use electronic information and information and communications technologies (ICT) to improve health outcomes for Canadians."*

Goals - Three goals have been derived from the stakeholder consultations and the ACHI Tactical Plan, 2001 Update:

1. Improve the availability of advanced HI education and research programs in Canada, specifically MSc and PhD level opportunities.
2. Ensure that HI training is incorporated in to the curricula of Canadian clinical training programs, to enable graduating nurses, pharmacists, doctors, etc. to use ICTs effectively in the workplace.
3. Increase the number of HI programs with more flexible, non-traditional delivery options to improve access for practicing health care professionals to the full continuum of HI educational programs available in Canada.

Tactical initiatives – To achieve these goals, four tactical initiatives are recommended in the areas of Leadership and Partnerships, Educational Opportunities, HI Enabled Change Management Practices, and Nurturing HI Competency. These initiatives are described below:

1. **Leadership and Partnerships** – To establish the foundation necessary to move the HI education strategy forward. The action items are to:

   1.1. Identify a major sponsoring organization to provide financial and process support to move this strategy forward over the next 3-5 years. Examples of support include the provision of a secretariat function, and hosting of stakeholder planning workshops.

   1.2. Establish a pan-Canadian task force with HI leaders and representatives from key stakeholder organizations to lead, facilitate and coordinate the implementation effort.

   1.3. Enrol additional stakeholder organizations to participate in the implementation planning to ensure buy-in of the strategy. A broad-based representation from multiple organizations involved in or affected by HI should be considered to maximize participation.

   1.4. Develop an implementation plan with specific projects, tasks, deliverables, timelines and resources identified.

2. **Educational Opportunities** – To improve the depth, consistency, and availability of HI education and training programs across Canada. The action items are to:

   2.1. Conduct curriculum review workshops among educational institutions to harmonize the type, consistency and depth of existing and emerging HI educational programs. This is to ensure that collectively, these programs can provide the broad range of HI education and training experiences needed.

   2.2. Expand existing/emerging HI educational programs to include flexible and distance delivery formats especially for health care professionals already in the workforce.

   2.3. Integrate HI knowledge and skills with existing curricula that educate care providers, such as nurses, physicians, pharmacists, etc.

   2.4. Seek both traditional and alternative funding sources to invest in the development and adaptation of HI educational programs, as well as the recruitment of additional faculty, instructors and support staff. Example sources may include Provincial Ministries, health organizations and professional associations as the means for capacity building and professional development.

3. **HI Enabled Change Management Practices** – To establish best practices in HI that will improve the adoption and use of health information and ICTs in health care organizations. The action items are to:

   3.1. Develop/refine HI methodologies to increase the rigour of HI in practice. Examples include the refinement of system development process with active user

participation, ICT evaluation methods, and means of sharing lessons learned.

3.2. Increase opportunities for health care professionals to gain practical HI experience, such as linkage to F/P/T primary health care reform, and inclusion of training/evaluation components in ICT initiatives.

3.3. Identify HI recommendations in recent commissioned reports (e.g., Kirby, Romano, Mazankowski, Fyke and Clair[3]) to encourage health care organizations to adopt an evidence-based culture with HI as an enabler.

3.4. Recognize and reward success in HI as an incentive to improve the adoption and use of health information and ICT in health organizations. Examples include the annual U.S. Davies Award for organizational excellence and HITS (Healthcare Innovations in Technology Systems) Award.

4. **Nurturing of HI Competency** – To build HI competency at all levels of the health care system. The action items are to:

4.1. Identify, recognize and reward HI experts, leaders, mentors, champions and users for early adoption and use of HI in day-to-day practice within their organizations.

4.2. Encourage professional associations and colleges to incorporate HI competency as part of their practice standards.

4.3. Move toward certification of HI professionals as entry to practice or career advancement.

4.4. Protected time and funding should be encouraged from employers and professional associations so that health care professionals can pursue professional development opportunities or more formal HI education.

CURRENT STATUS

Various initiatives to build capacity in HI have emerged over the past year by different stakeholder organizations across Canada, which are consistent with, related to, or directly aimed at the actions outlined in this strategy. Such examples include:

- The Canada Health Infoway Inc. formed 2 years ago by the F/P/T governments to facilitate the deployment of electronic health information systems (EHIS) in Canada has identified change management as part of its business plan and is working on ways to increase the adoption and use of EHIS in health care organizations.
- OHIH continues to play a facilitation role by encouraging different stakeholder organizations to take on specific initiatives outlined in the strategy.
- The Canadian Nursing Informatics Association has recently completed a comprehensive study on the educational needs of nurses in HI, and is working with the Canadian Nurses Association and educational institutions with nursing programs to implement its recommendations.
- The Canada's Healthcare Information Technology Trade Association is exploring a HI professional certification similar to HIMSS' Health Information Systems Professional designation.
- The British Columbia Institute of Technology is exploring the U.K. idea of a computer literacy driver's license for health professionals.
- More flexible HI educational and training programs have emerged recently. Examples are Waterloo's HI certificate program for health professionals, Ryerson University's newly approved flexible B.Sc. in health information management, and UVic's M.Sc. distributed program stream being planned for fall 2004.
- A 6-year pan-Canadian PhD/postdoc training program in HI has recently been funded by the Canadian Institutes for Health Research and BC Michael Smith Foundation for Health Research for 8 Canadian universities led by UVic.

REFERENCES

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2. Covvey D, Zitner D and Bernstein RM. *Pointing the way: competencies and curricula in health informatics*. URL: http://hiru.mcmaster.ca/nce/about/workshop/ptw.pdf. Last accessed Feb 14, 2003.
3. Copies of these commissioned reports available from authors upon request.

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