Information Technology, E-Health and Electronic Health Records

*E-Health and Electronic Health Records* were frequently raised as opportunities to introduce innovation and efficiencies into the health care system. Information technology planning, a common health information database, the introduction of electronic health records for British Columbians and the more common use of e-health technologies were all discussed in the Conversation on Health. Here is a selection of what British Columbians had to say on the subject of *E-Health and Electronic Health Records*.

Information Technology Planning

The key issue raised by participants around information technology is the need for both integrated planning and an integrated information system that would bring together all of the health authorities and the Ministry of Health. Participants are concerned that there is very little consistency now on information technology standards and applications, resulting in different technology platforms that do not talk to one another. While participants understand that costs are associated with introducing new technologies, particularly on a large scale, they argue that proper planning and analysis can result in savings over the long-term.

Some participants suggest that, in the absence of a clear plan, the frequent introduction of new technologies has had undue impact on employees and burdened the system with significant costs, while not substantially improving operations. Others caution that some people may be looking to information technology to solve all the challenges of integrating services and facilities. They warn that, even with these new technologies, people in the health care system still need to work hard to integrate health services: technology alone is not the answer.

Participants recommend that there be a centralized information technology planning process with clear guidelines around the purchase and implementation of new information technology. They suggest an initial investment to achieve integration across the system, which would provide the tools for more efficient health care delivery. They also argue that, whatever the process, there should be a centrally managed short-term and long-term plans. This will ensure that the investment continues to pay off in years to come.
Participants support an overall strategic vision for information technology, developed by the Province and by health authorities. The vision needs to move away from old style information technology conservatism, which is preventing health authorities from achieving its goals, to use of information technology as an enabler of change.

– Health Authority Board Workshop, Vancouver

Health Information Database

Participants criticize the health care system for its lack of sound data on everything from population health to health human resources. This, they argue, means that there can be little evidence-based health care planning, including planning of services, delivery mechanisms or recruitment needs. Some participants suggest that if the system gave general practitioners information about the health of the population they serve, they would be much better able to adjust their services to improve the overall health of that community.

Aboriginal participants argue that, in the absence of sound data about First Nations community needs, they will continually be left out of the mix. The common phrase was: if you do not count it, it does not count.

One suggestion was that the province move to a geographic information system (GIS), which would graphically demonstrate health data, allowing for easy analysis.

Electronic Health Records

The most frequently discussed information technology tool was the electronic health record. Participants are frustrated with the lack of communication between health practitioners and facilities as a result of the inability to transfer or access individual health records easily. While some participants are concerned with the protection of their privacy, most believe that the electronic health record would result in efficiencies in the system and improved patient care. They also argue that privacy concerns could be addressed through security measures that are at least comparable to the measures we have in a paper-based system.

Many participants argued that an electronic health record would make their own health more accessible to them. They would be able to look at their files, for example through a web link, and better understand their condition and how to cope with it. This, they argue, could be a key tool to empower individuals to take control of their own health care.
Encourage the provincial government to develop a closed and secure electronic network system for maintaining patient history, distributing medicine, tracking services, and tracking inquiries to avoid duplications, make treating patients more efficient and therefore make treating patients more cost efficient.

- Regional Public Forum, Burnaby

E-Health Technology

Like the electronic health record, participants look to all sorts of e-health technology to introduce efficiencies in the health care system. They praise existing tools like the NurseLine or the online BC HealthGuide as being effective methods of empowering British Columbians to take care of themselves. At the same time, they encourage the government to better advertise these tools to make them more accessible. Pharmanet was another topic for discussion. Participants criticize this tool for not taking advantage of the possibilities it presents to patients and practitioners, for example, around e-prescriptions.

One idea put forward in a Focused Workshop in Vancouver was the development of an interactive website, named Health Quest, which would provide health care information and coordinate services for patients. The site would provide links to community information and resources based on the inquirer’s area of interest. It would also be able to link inquirers to help lines when necessary. It would consolidate information and be based on sound principles and evidence-based practices. Physicians will therefore know it is reliable. The site would encourage self-care and provide the patient with more control over their own care.

Participants who have been exposed to e-health technologies argue strongly in their favour. In particular, British Columbians from rural areas believe these technologies are the answer to improving services for rural and remote communities. Often, e-health technologies can bring the health care service or procedure to the patient, rather than the patient spending time, money and energy, travelling to specialists. This kind of access for rural British Columbians means timely diagnostic testing, efficient consultations with specialists and less stress on the patient through travel. Participants believe these and other benefits mean keeping more British Columbians out of the acute care system.

I once saw a surgeon operate on a patient, and the doctor’s scalpel was approximately 2.0 centimetres from the patient’s heart. [This was] no big deal. I’m sure that this is done every day in Vancouver. However, in this instance, the surgeon was 1,000 kilometres [away] from the patient.

- Email
Conclusion

Participants in the Conversation on Health, for the most part, agreed that the introduction of integrated information and data systems, electronic health records and new e-health technologies would substantially improve patient outcomes and the efficiency of health service delivery in British Columbia. While there are lingering concerns around protecting patient privacy, the vast majority of participants encourage government to move forward on an agenda that brings electronic innovation to health care in everything from health information databases to remote surgeries.
Information Technology, E-Health and Electronic Health Records

This chapter includes the following topics:

Information Technology Planning
Health Information Database
Electronic Health Records
E-Health Technology
Pharmanet and Technology

Related Electronic Written Submissions

Chronic Diseases
Submitted by the Health Officers’ Council of British Columbia

Primary Health Care
Submitted by the BC College of Family Physicians

HHR Resources
Submitted by the BC College of Family Physicians

A Vision for 2017
Submitted by the BC College of Family Physicians

Family Practice Recommendations for British Columbia’s Health Care System
Submitted by the Society of General Practitioners of British Columbia

Health Needs of Ethnocultural Groups on the North Shore
Submitted by Jean Thompson

Aboriginal Conversation on Health
Submitted by Vancouver Coastal Health

Sunshine Coast Conversations on Health
Submitted by the Women’s Health Advisory Network (WHANT), the Sunshine Coast Hospital and Health Care Auxiliary and the Seniors Network Advisory Group (SNAG)

Submission to the BC Conversation on Health
Submitted by the Victorian Order of Nurses Canada

Submission to the Conversation on Health
Submitted by the BC Cancer Agency

Submission to the British Columbia Conversation on Health
Submitted by Life Sciences British Columbia

A Vision for Better Health
Submitted by the British Columbia Dental Association

British Columbia’s Conversation on Health
Submitted by GlaxoSmithKline
Related Chapters

Many of the topics discussed by participants in the Conversation on Health overlap; additional feedback related to this theme may be found in other chapters including: Innovation and Efficiency; Collaboration in the System; Primary Health Care and Health Care Models.

Information Technology Planning

Comments and Concerns

Current State of Information Technology
Integrated Information Technology and Planning
Investment in Information Technology

- Comments on current state of information technology:
  - The information management technology is archaic and run by highly fragmented organizations, leading to significant safety issues and inefficiencies.
  - You need to do a cost benefit analysis around putting in the necessary information technology. You can save huge amounts of money down the road. Then you get your data and you actually know the health outcomes on so many different levels. We just have to get that.
  - The management system and tools lag private industry. There has to be a better model. Much more efficient computer-based management systems are available.
  - I think we need to be thinking about how our society ought to structure itself in the future and how it will structure itself as information technologies become more and more integral to how we live and work.
  - The use of technology is replacing human caring.
  - All quality improvement gurus will tell you a fundamental core of quality improvement is information technology, and particularly patient-centered information technology.
  - Here is a cautionary note regarding the magical feeling we have about information technology. If we came away with a lesson from the first round of health innovation funding, it was that it is very easy to spend a lot of money on computers and it is very easy to spend a lot of time thinking that we do not have to do the hard slogging work of working together because if we just had an electronic medical record, the gates would open and the future would be set.
Government could play a role in inspecting some reputable health related websites. They could have a committee that looks very carefully at them, whether they are pamphlets, other kinds of advertising, social marketing, television programs and so on around these sites. The first of all 62 per cent of people of all ages used the internet for health information last year. Even though not all seniors use the internet, it is now getting up to 50 per cent. Then there is their family members who collect information. So it is an area that we can look at and there is real cost benefit here. Although there is need for more research, the cost benefit looks pretty good. It is not that expensive to develop a site for everybody. If you divide up the cost per person, then it is probably pretty low.

We are actually going backwards as a country in terms of data availability. The movement to alternate funding plans has resulted in a data loss in primary health care. It has never been clarified whether or not the data captured by electronic health records or by practitioners actually belongs to the public system and can be used for secondary data analysis.

A part of the challenge is you can put technology in place, but the users are the challenge, both in terms of the professionals who have to learn how to work this stuff and consumers who need to understand what the limits of the technology are.

It is a real benefit in some ways that Canada has such a low uptake of information technology. Now you have a clean slate: you can start from scratch. So you can put in place systems that will work and that are inter-operable.

Denmark is the most e-health wired country in the world. Everybody in Denmark can log on, look at their health record, see what test they have done, and know when their last surgery was. Their doctors can look at the latest x-rays. Everything is digital. The challenge with it is the cost benefit. Information technology is not cheap. Our struggle in the health care system is the balance between things that are really nice to have, and those things that are simpler, less expensive and can do the job just as well.

They have a fabulous information system in California that was done by a foundation in the universities. You can find out about every long-term care or community health facility. It tells you what kind of staff they have and what kind of services they offer. They can also tell you about patient satisfaction and whether there have been problems. It would be quite expensive, but it is quite an amazing system because it becomes self-serve.

In New Zealand there was a rapid movement into patient management software and information systems and primary care. Ten years later, the government is now pushing a much more primary care oriented model and it also wants a
national information system, but it cannot do it because of the embedded systems developed in the nineteen nineties. All of the general practices and primary care organizations have different electronic systems in place and now it is an absolute nightmare. There is a high uptake in New Zealand: up to 90 per cent of general practitioners and primary care organizations use electronic records, however few of them can actually talk with one another.

- Information technology is an area where Canada has a lot to learn from other countries. A recent survey showed Canadian doctors are in last place in a Group of Seven Organization of Economic Co-operation and Development (OECD) countries in the uptake of the electronic health record.

• **Comments on integrated information technology and planning:**

  - Health authorities support a move to an integrated information technology environment. To do this, leadership at a provincial level is required and collaboration provincially and federally must be improved. Furthermore, within health authorities there should be a focus on integration.

  - We have six health authorities with different computer systems. They are not even integrated. The government provided the funding, but did not say that health authorities have to agree on one and buy one so that they will all talk to each other.

  - Currently, there are different planning processes within health authorities. More consistency is required and the Ministry of Health has a clear role in making this happen, including setting common ground rules and standards, providing provincial funding assessments based on need, and improving strategic planning. Some effort needs to be undertaken to understand those information technology planning processes, which need to be managed provincially.

  - We need better planning on the efficient roll-out of technology. The federal and provincial governments are spending oodles of money on the Electronic Health Record, but there is no coordinated approach.

  - As knowledge expands (including management approaches) and society evolves (particularly the development of information technologies) there is a need for health care and health care disciplines to move from a gradual evolution to major transformations to align with these changes. It is not a time to be timid; a strong commitment to meaningful and effective change is required.

  - There is little or no standardization and compatibility of systems and technology.
• A group was doing some research at the University of Victoria, and said that you can have health care collaboratives, but if you do not have accessible information through technology, then you actually get a bunch of people who are trying to collaborate but they do not have the information. The information technology is fundamental if these collaboratives are to work. That is one of the things that fundamentally holds some of this collaboration back, access to information.

• Networked access to diagnostics, especially radiology, between remote sites of Vancouver General Hospital is excellent. Broaden this electronic access.

• In Canada, we rely on a regional health authority approach. Yet the regional health authorities are investing in different technologies, which mean that there is no standardization of programs, suppliers or software.

• Improved and integrated health information systems can support: coordination of services and continuity of care among providers support evidence-based decision-making; coordination of services and continuity of care among providers facilitate audit and outcome measurement; coordination of services and continuity of care among providers assist in planning, management and resource allocation decisions; coordination of services and continuity of care among providers provide tools and information to support health professionals in their clinical decision-making; and coordination of services and continuity of care among providers.

• Comments on investment in information technology:
  
  • Health care is a business and successful businesses invest in technology and education. The health system creates a framework for services and deliverables.

  • Why is the province spending up to $200 million building the Provincial Laboratory Information System (PLIS) from scratch rather than working with the established, proven and cost-effective systems already in place?

  • There will never be enough money for health care. Technology becomes increasingly expensive, and seems to be given free reign to dominate all aspects of health care. New software programs are purchased and used by health authorities with nominal review and at significant cost to the public purse. Some of these have had incredible impacts on the lives of employees, with morale at its lowest due to overload of work, and short notice demands by health authorities and the Ministry.

  • We have adopted an electronic record system and it is web-based. So it means you can access it from anywhere. It cost a lot of money and it took quite a while to hone the thing, but now the efficiency has just gone through the roof.
• Funding and confidentiality issues have blocked movement on information access initiatives.

• We do not invest as much as others. Infoway has about $1.5 billion. You are going to have to add zero to get the Pan Canadian electronic health record done. If we do not do it, we will not measure up, know what performance is, be able to compress variations, or report confidently in real time how well the system is actually doing.

• Health authorities acknowledge that when the budget is tight, information technology investment and planning are the first to get cut. Dedicated funding might alleviate this problem.

### Ideas and Suggestions

**Current State of Information Technology**

**Integrated Information Technology and Planning**

**Investment in Information Technology**

• **Ideas about the current state of information technology:**
  
  • Start by prescribing standards, programs, suppliers and software.
  
  • Develop guidelines for use of new technology.
  
  • Create a standard for information sharing.
  
  • Establish electronic connectivity standards for communicating patient information between family doctors, hospitals and other health professionals.
  
  • Everything should be under one single umbrella coordinated by the Minister of Health in collaboration with doctors and nurses.
  
  • Develop standards for health information and reporting. Development should include interested parties such as representatives of primary care health organizations in British Columbia, along with research organizations and relevant divisions of the Ministry of Health. The process should include the development, testing and refinement of systems, including reporting systems, which are fully adequate to sufficiently answer the care, development and reporting needs of primary care in the province.

• **Ideas about integrated information technology and planning:**
  
  • Use technology to improve communication.
  
  • Develop a collaborative system with other organizations outside of government.
• We need an electronic system for communication across the network and providers, standardized across Canada so that it is inter-operable.

• The government needs to be proactive and do better long term planning of how all the health authorities, physicians and other provinces will integrate electronic health records.

• Technology needs to be used and funded to drive change to prescribed standards and protocols.

• Health authorities require overall strategic vision for information technology, developed by the Province and by health authorities collaboratively. The vision needs to move away from old style information technology conservatism, which is preventing health authorities from achieving its goal to use information technology as an enabler of change.

• Ideas about investment in information technology:

  • Implement a Geographic Information System (GIS) to improve the ability to demonstrate health information graphically.

  • Government must put a priority on funding for information technology, including electronic health records.

  • Make a major one-time investment to support the rapid development of a province wide medical records system and do not let political and turf issues get in the way of getting it done.

  • Subsidize hardware and software acquisition and ongoing support required by family doctors to maintain electronic connectivity with hospitals and other health professionals.

  • We require an initial investment to get information so that we know where to spend money. The electronic health record is a good place to start.

  • Provide increased funding to technology to streamline the public system.

  • In Canada most jurisdictions do not have good health electronic records. So if you need to make an initial investment, then maybe that is where to start. Then you have the information necessary to identify where you are going to move your pockets of money around. Because, to be honest, there is always more money needed in health care, especially because we have moved from health care that is needs-based to quality-based. That is what the rising cost of technology is from: it is not necessarily a need thing. We are no longer providing needed health care, we are providing health care that improves quality of life, and for that type of decision you need information as to where you want to spend your money, or you can just keep spending all your money on improving quality at what cost?
• Investment in electronic health records and automation of task is huge because often 40 per cent of staff time is spent in documentation. We are spending about $1 billion, but we have to spend $10 to $15 billion in Canada.

**Health Information Databases**

**Comments and Concerns**

*Databases to Monitor Health*

*Administrative Systems*

*Public Information*

• **Comments on databases to monitor health:**

  • We are not tracking public health care trends.

  • Government information sources need to be current, accurate and accessible.

  • The technical capability exists (for example in linked data analyses, using information from existing databases) for the Ministry of Health to assist each primary care physician to better understand the population health profile of their patient population. Such information could improve a physician's ability to focus their clinical prevention practices.

  • One of my big frustrations with government right now is with the Knowledge Management and Technology branch in the Ministry of Health. Their perspective is that we are there to serve them. That is a very sensitive issue. It is very frustrating, because they should be serving the outcomes of the goals of other branches of health, instead of the reverse.

  • We need to acquire good data, and understand the context with minimal lag times between acquisition of data and interpretation.

  • A good information system would support whether we are achieving health outcomes, and would also link health authorities.

  • There is software out that we use in health, and broadly in government, called Geographic Information Systems (GIS). We have a booklet that will show you the incidents of measles by communities around the province. You can click on the electronic version of that, and you can see how many cases there were for a couple of years, as reported by physicians.

  • There are silos of information, and therefore no integrated health information.
• We need health data strategies. If it is not counted, then you cannot do something about it. This is so fundamentally important and is something which we have actually done reasonably well in Australia. There is a National Health Information plan, which has a significant strategy for Indigenous health data, and a governance strategy which enables Indigenous people to take a lead role in the Indigenous primary healthcare service. Indigenous academics and other people actually take a lead role in deciding where the priorities are for health data development.

• Comments on administrative systems:
  • Health authority payroll systems do not operate in the same way from one health authority to another, so you cannot analyze your health human resource data from looking across the payroll systems because you have got different payroll systems.
  • We have no real-time information in Canadian health care except billing.
  • Communication between ministries in government causes an unnecessary level of redundant paperwork. There needs to be a computerized system.
  • We need a prescription drug system to report problems with medications and to provide information.
  • We need more information systems so that managers can use staff effectively. They cannot get overtime data on a daily basis. They cannot get sick leave data. Our systems are not at the point where they are delivering daily information that people need to run the system effectively.
  • Use Geographic Information Systems as a platform for a road map, to identify where health services lie, like MapQuest. This service could also have a phone number attached to it and not just be a web based application. People living in Campbell River can click on that map and determine where the mental health office, the hospice, and the regional hospital are. We can do that now with physician offices, we can click on the map and find any physician office in the province.

• Comments on public information:
  • Given the well-recognized issue with lower joint care, there should be a dedicated link on Health Authority websites that leads citizens to information and resources for lower joint care.
  • We need increased public awareness of health issues facilitated by access data from a source that can be trusted.
Ideas and Suggestions

Databases to Monitor Health
Administrative Systems
Public Information

- **Ideas about databases to monitor health:**
  - Provide physicians access to population health statistics along with electronic health records so that the family physicians could actually invest in long term research to see what the impact was down the road of their practice has been. We cannot do that now because of the lack of access to epidemiological data.
  - We need to be able to share information between health authorities, other ministries and community services.
  - We need to take a representative body within First Nations communities in order to gather an accurate database from which we can accurately measure progress.
  - Health information systems should be linked to assess socio-economic position, sex, age, race, and geographic position. They should track flows of health resources, access utilisation and financing, and providing better understanding of the extent to which investments in health care improve health.

- **Ideas about administrative systems:**
  - A significant cost savings could be made if we were to create a secure medical database on a mainframe that can be accessed by the medical establishment. The database could be backed up in different facilities across the province keeping the data safe from fire, theft and even natural disasters.
  - An information system would assist in the analysis of demographic information, tracking pharmaceutical use and prescriptions, providing information on health care costs, and tracking users through the system.
  - We require implementation of technology to manage a database, integrated across the province and all health care services. A Master Patient Index (EMPI) would be the first step. Set targets at the local (health authority) level. We need global data to identify benchmarks. Look at local targets and management.
  - We need an effective central registry of availability of resources diagnostics, and specialists for queue management. This would be accessible to all family physicians to refer their patients. We need a data base so that we can, on an annual basis, see what progress the First Nations communities have made, to be able to see where the gaps are and what we need to do to make the necessary
alterations to achieve our objectives. For that to be done, we need to go into the communities.

- Create a centralised database, like PharmaCare, to keep track of diagnostic tests.
- We need a regular audit of the wait-list by a body that monitors a database that contains wait-list information.
- We need a centralized criteria-based wait-list management system per type of service (including surgical care) that is regularly audited and is supported through a provincial database and staff that is properly resourced.
- Implement an improved management information system to track supplies and costs.
- A national information system would link everyone with set medical protocols.

- **Ideas about public information:**
  - Using an electronic health information system, you could individually input lifestyle factors like what you eat, whether you smoke, and how much you exercise, along with your electronic health record which contains your vital statistics information. The system would then use some time-generated graphics and see what you would look like in ten years.
  - Share information.
  - Improved information technology and information tracking would allow the government to track health care expenditures by patient, and permit the issuance of statements to citizens about how much their use of the health care system cost annually.

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**Electronic Health Records**

**Comments and Concerns**

- **Efficiencies and Patient Management**
- **Implementation**
- **Monitoring Population Health**
- **Protection of and Public Access to Information**

- Comments on efficiencies and patient management:
  - Too many doctors and hospitals are still using paper files.
• In Europe, medical records are part of integrated tracking system for clinical information which is interconnected to a central data base that allows tracking of medical procedures, prescriptions, and so on.

• The electronic health record process is fairly well underway. It has not actually delivered a lot yet, will create accessibility by all health practitioners and patients themselves to patient records, which will eliminate duplication and increase efficiencies.

• Test results are not available electronically, which requires manual transfer of images and files. We have to wait more than a week and up to a month to get results to a general practitioner.

• Current disparate paper-based systems are costly and ineffective.

• In New Zealand, the integrated electronic charting system works well and has resulted in enormous cost savings, a great reduction in drug misuses and a benefit to proper diagnosis and treatment.

• We need better sharing of patient information amongst the health care sector to better manage a person's health.

• European doctors use computerized alerts about potential prescribing problems.

• There is no adequate sharing of information with other practitioners and an adequate database does not exist.

• Informational continuity may assist in reducing repeat testing, and ensure follow-up on critical issues of health promotion, prevention or care.

• WorkSafe BC created a program called e-File in which every piece of paper received regarding claim information was scanned onto the computer. Then, when you needed to look something up regarding a client, you simply punched in their claim number or last name and you got a list of everything scanned. There was an area for writing claim notes as well. This system was ingenious because it meant that everyone could have access to the same information without waiting for a file clerk to retrieve the file. Do you want to go one step further? Create a central database system with all government agencies that are directly related.

• The initiative that will probably yield the best results is the electronic health record. If you are going to have patient-centered care and you are working with multidisciplinary groups and multi-practitioners, that is the consistent way of getting information out, rather than relying on referrals which is time consuming and expensive. Instantaneous, correct information will eliminate duplication of records, duplication of tests and adverse reactions to drugs.
In the State of Denmark, there is one thing that is definitely not rotten, and that is information technology. In contrast to our situation, virtually 100 per cent of Danish physicians use electronic health records, and they report themselves that having this electronic health record saves them about an hour a day in chasing down information from hospitals, in making telephone calls, in reviewing records, in finding out things, again, that they could find out with one keystroke with the electronic health record. It is also a very patient centered system. Patients have access to their own electronic health records on the web, and not only can they understand their own conditions and follow their own treatment and manage themselves better to a certain extent, but they can also see who has had access to their record. So the people who have had access to your record are identified on your screen. If you have a problem with it you can tell them. This is a solution that is available. But it took a lot of time. They had to do a lot of training. There is a lot of support for physicians and others to learn the system well, and there are careful strategies for ensuring that the reports are useful to practice, management and resource allocation.

We would save time, energy and money if all tests and services were recorded and accessed by swiping our CareCards. All of the information would be centralized.

There is a lack of access to information for decision making.

There are no integrated patient health records.

Better information equals better health care.

The hospital admission process would be streamlined if CareCards included patient history.

When a patient changes primary care physicians the records do not automatically transfer to the new primary care physician. This results in fragmentation of medical information.

An electronic health record system would allow general practitioners to keep and transfer records efficiently. It can also be used to queue people with available surgeons, and reduce and handle patient no-shows (including reminding patients of scheduled procedures).

One implication of the electronic record is to ease the administrative burden. When you enter the system, it will log your time, and if you have your tracking built right into your electronic record keeping, you are not filling out more forms.

There is a real push and pull going on in terms of what information should be shared with providers through the electronic health record. It is a big issue because right now with Pharmanet and hospital records. They now have a tracking system to see who accessed the system and did they have a good reason.
The pharmacists are doing it already. So there is a risk for privacy, but on the other hand it is balanced with improving people's health. Consent legislation on the privacy side is trying to find that balance. In the case of dentists we are going to be asking for full disclosure of the electronic health record, but that does not mean we are going to get it. It is a long road of negotiations that still have to happen.

- Often dentists rely on the patient for information about diabetes, which has an effect on oral health. Some conditions, like diabetes, can be diagnosed by a dentist and referred on. And that is where the electronic health record can help. If that core information can contain the critical information, there can be greater integration of all healthcare providers, as well as reducing the number of lab results and eliminate duplication of prescriptions.

- You cannot manage patient flow properly without an integrated information system.

- In the Fraser Health Authority there is a partnership between the NurseLine, a provincial tele-triage and health information call centre, and the Fraser Health Hospice Palliative Care Program. It allows for after-hours access to care and information for dying patients and their families. This program has improved outcomes of symptoms management, cut down on the number of visits to our overloaded emergency rooms, and enhanced the support for families of the dying.

- The NurseLine is not integrated with the rest of the health system. In part this is because the information technology infrastructure for primary health care is years slower in development than other jurisdictions, so the information is not available to the nurse on line. However, neither is there any effort to convey the nature of the call and recommendations shared with the family physician. None of the investigations or hospitalization information is available (some good work is afoot with the CareConnect project). For this reason, it is not appropriate for the NurseLine to initiate referrals.

- You need e-prescribing to make the best use of an electronic health record. It has to, at the minimum, be hooked up to PharmaNet.

- The potential benefits of a robust electronic medical record include: patient access to a practice website (which includes patient management of appointment bookings; patient access to approved (by relevant health provider) laboratory and diagnostic test results; personalised information when logging on with information pertinent to the age and gender and health conditions of the patient; a patient problem list accessible to other providers with patient provided permissions; many patients will have their own health record on line, which may
or may not link to their physician’s electronic medical records; automated reminders of pre-scheduled appointments by provider (any of the clinic staff or consultant referrals, and so on) by automated calls to home phone, cell phone, text message, email, and so on, as preferred by patient; automated reminders of follow-ups, including lab tests (with instructions), repeat imaging, next pap or mammogram, and so on. These are often to be done before an appointment, enabling the encounter, by whatever means, to build on the information from the results.

- MDS metro has pioneered the secure electronic transmission of lab test information through PathNet, now known as Excelleris.

- **Comments on monitoring population health:**
  
  - Dutch doctors have a very effective computer-based reporting system which is shared with other doctors via a central registry. During the Severe Acute Respiratory Syndrome (SARS) crisis in Toronto, they tracked cases using index cards.
  
  - What do we need to do to make the electronic health record effective at changing health outcomes? You could identify registries or subsets of patients who have specific needs. You can include chronic disease management in that so that people who present need to be reassessed at some point. If it is a pap smear, you need to reassess them every couple of years. If it is a mammogram, you have not been doing them at all until they get to be 50 and then you have to see that they are getting it done every year or two. If it is hypertensive, then you need to probably have a check on the blood pressure every four to six months, at least. If it is congestive heart failure, then you probably want to talk to them at least every month. So there are cycles like this that can be tracked through value added processes tied to and dependent upon the electronic medical record.
  
  - There is no list of home-bound seniors and those with medical needs in case of a natural disaster (such as an earthquake).

- **Comments on implementation:**
  
  - The provincial e-health strategy has quite clearly articulated the future, and the option of having a CareCard with your electronic health record on it is probably not on the table.
  
  - Physicians and other clinicians can go paperless with greater ease, thanks to low-cost wireless networks, powerful and portable electronic devices, a wide range of data input options, and increasingly intuitive software.
• It is not the tool, rather it is how you implement it, train staff, and use that tool. You could do an electronic health record and you could have no impact on patients or on health outcomes.

• Meditech records contain detailed mental health records if the patient had counseling through a mental health centre. These records can contain information about child abuse, incest, molestation, rape, spousal abuse, drug abuse, criminal charges (patient as victim) or criminal records, ongoing criminal actions and other police involvement. This would include names and dates. Some of this information, especially involving children, is held in the strictest confidence with the police. Under Meditech, this information is available to a wide range of medical staff including receptionists and secretaries at the physicians’ offices.

• The piece that is missing is that we keep talking about the successful implementation of this tool versus the goal. We need to be saying that the goal is the improvement of the health management, and so if it is presented to a physician’s office saying that we want to have successful implementation of this tool then that ultimate goal can be lost. There needs to be accountabilities in place around having that as the final measurement of success.

• Between seven and eight per cent of doctors in British Columbia have e-records. It is a complicated and time-consuming procurement process, with a steep learning curve and a resulting drop in production during the first year of implementation.

• Doctors are reluctant to enter information into computers, so they require incentives.

• There is difficulty with high speed internet access across the Province.

• According to a 2006 survey by the Commonwealth Fund, electronic medical record use by American primary care physicians is just 28 per cent, compared with 79 per cent in Australia, 89 per cent in the United Kingdom, 92 per cent in New Zealand, and 98 per cent in the Netherlands and nearly 100 per cent in Denmark even though the Danish government provided a relatively small amount of funding.

• **Comments on protection of and public access to information:**

  • Nothing frustrates me more than the fact that I can go on the internet and I know everything about my financial situation, I know what bonds I have invested in, I know everything, but I do not know what my blood type is.
• It is a waste of time to deliver a statement of costs to patients. It confuses them. Alberta tried that a few years ago. It did not go well. People did think it was a bill.
• People could access their records when they have questions. For example, they may read about a new study on high blood pressure then they could check their record to see what their blood pressure is.
• Privacy concerns have gone too far and get in the way of electronic health records.
• Patients do not have access to their own laboratory tests, Medical Resonance Imaging (MRI), x-ray reports, and so on.
• The protection of patients' medical records is not going well. The privacy system requires rigorous maintenance.
• Doctors own patient records and many are reluctant to transfer knowledge to enable patients to take control.
• My doctor's office has access to information recorded by the NurseLine as a test project.
• The elderly find it difficult to navigate electronic systems.

Ideas and Suggestions

Efficiencies and Patient Management
Implementation
Monitoring Population Health
Protection of and Public Access to Information

• Ideas about efficiencies and patient management:
  • There is better use of dollars and resources by utilizing advanced technology to support the digital health care card system (patient medical history) and streamline and prioritize point of entry into the health care system.
  • Encourage the provincial government to develop a closed and secure electronic network system for maintaining patients' history, distributing medicine and services, and tracking inquiries to avoid duplications and to treat patients more effectively. This will make treating patients more cost efficient.
  • There is a need for electronic records to ensure continuity of care and utilisation management.
- Hire community wellness managers with hubs that are linked by a database. They could manage a wellness plan for each patient and act as a bridge between various health and community services.

- Implement a Medic Alert Bracelet with a memory chip that can be plugged into the computer at the hospital with all the health records already on it.

- Vital statistics and medical records need to reflect positive qualities, gifts, and talents of all people so that health practitioners see the person as a whole person, not just an illness.

- Have a website run by the Cancer Agency with personal information, chart condition, personal log in identification, access by health care providers and the patient, and the ability to ask doctors questions.

- Have longitudinal health records for everyone, that is, a record, easily accessed, of health information on each person from birth to death.

- There should be full access to patient records and histories for all health professionals whether they are working in the public or private system and regardless of which facility they serve. This information would be accessible through the CareCard.

- Develop electronic patient charts that follow the patient.

- Look at closing the gap between changing medications and having the new information show up on the computer.

- When a patient is in need of repeated emergency visits, a computer-generated patient history could be available to more efficiently communicate and move towards quick diagnosis and treatment.

- Address the electronic health records for First Nations.

- Create an electronic scheduling system to book appointments.

- Advanced care directives and organ donor information should be included on electronic health records and accessible through CareCards.

- **Ideas about implementation:**

  - Sponsor computer technology students to work in hospitals and develop and maintain medical record programs.

  - Develop a partnership between the provincial government and the Victorian Order of Nurses (VON) Canada Caregiver Portal to extend access to the electronic drug recording system to caregivers. This would improve client safety and reduce medication errors.
- A computer station should be made available in each hospital room on which you would record the patient activity. This would go a long way to defining who is directly responsible for specific activities in supporting the patient’s care.
- There should be electronic health records that permit centralized access to patient charts.
- Doctors should be offered tax deductible computers and training to assist them to get on the system.
- Hire coordinators to develop databases with health records and plans.
- If a physician’s concern about expanding the scope of practice of other health care providers is that they would not know what others are prescribing, then give them the electronic record and their whole argument falls apart.

- Ideas about monitoring population health:

  - The e-health record should be linked to all social services to ensure that records are complete and patients are effectively treated. This would reduce duplication in treatment and services, and ensure that practitioners are aware of all aspects of the patient’s condition before designing treatment options and working with other service providers and practitioners on a holistic treatment plan.
• Ideas about protection of and public access to information:
  
  • Develop secure electronic records by having health care numbers identify patients and patient information stored on a computer system which could be accessed by authorized physicians and surgeons.
  
  • Only confirmed psychiatrist diagnoses should be on Meditech records. No other mental health reports should be on Meditech. Family physician and specialists' reports can only be released on Meditech with the signed consent of the patient. Doctors and other medical staff can only access Meditech information with permission from the patient.
  
  • Improve sharing of information (test results, imaging, medical information) while maintaining privacy.
  
  • Create a secure health record network, which would include health records, laboratory information, reports, Pharmanet, consultant reports, hospital discharge records, and so on.
  
  • Improve access to medical information, especially for remote areas.
  
  • Once a patient enters a hospital for treatment, they must consent for all caregivers to access their records.
  
  • Create a personal access code to allow individuals to access their health records.
  
  • Patients will welcome and use an internet portal to make appointments, access their health record, contribute to their health record and access health information tailored to their health conditions.

E-Health Technology

Comments and Concerns

Service Delivery
Administrative Efficiencies

• Comments on service delivery:
  
  • We have been trying to expand tele-health. This would alleviate the need to move people: you can move information as opposed to people. This will enhance the quality of care that we provide to people as well.
  
  • There is a potential significant gain through e-health in family practice. A third or more of what is currently office-based care could be delivered through e-mail and telephone. But we have structured our current system to halt that kind of shift.
• Tele-health can actually televise the patient, and you can ask to see different areas of the body, or you can look at it. You can even do surgery remotely. It may be possible in future to do some of those surgical procedures remotely or at least regionalize that so you don’t have to go to Vancouver.

• The health care system needs new technologies and innovations. These can save money and time.

• Creating the opportunity to use technology is important. Couple our resources with others, such as Health-Link (Alberta’s one phone number for all information).

• E-health provides automated services that do not require a health professional present.

• NurseLine is a positive and efficient service.

• There is technology that monitors the house. But would this isolate seniors?

• There are tele-health projects that could bring any specialists to any patient with a webcam and immediately have a consultation.

• There are 80 communities in British Columbia that are wired for tele-health consultations.

• There is a growing awareness of the potential for technology to improve delivery. New and innovative technologies are available with decreasing cost.

• Technology offers some new options, such as remote viewing of medical images, consultation with specialists via video, and so on.

• In the last two years, five family members have traveled at different times from the Prince George area to the Kamloops/Kelowna area for health care assessments. All of these assessments were not urgent and could have been done through video- or tele-conferencing methods.

• Consider that many medical diagnostic procedures are routine and can be mechanized, that is, done by machine with no more than basic guidance on the use of the machine.

• I once saw a surgeon operate on a patient, and the doctor’s scalpel was approximately two centimetres from the patient’s heart. This was no big deal, as I am sure that this is done every day in Vancouver. However, in this instance, the surgeon was 1,000 kilometres from the patient. This is currently a viable alternative in Ontario, so perhaps British Columbia could follow suit.

• Has the time come for electronics and specialised programs to deliver some of the medical services we need to out-lying areas?
• Comments on administrative efficiencies:
  
  • Do all the community health nurses walk around with laptops? If not, they should have at least a personal device? You can dramatically improve productivity through certain parts of a health care system through technology and automation, reduce unnecessary administrative tasks, as well as do some clinical tasks safely.
  
  • If a team collaborates in an assessment of a patient in an asynchronous way, then the doctor looks at all of the findings, prescribes a prevention plan which includes pre-scheduled recalls and coming in for blood pressure checks or whatever is required. Technology can help too because if you try to do collaborative care with sticky notes and file folders it does not work.
  
  • There is an urbandoc network, and they have a web site and they cross cover for each other so that using this web system they come together on a regular basis. They have separate offices that are working together using this urbandoc.net framework, and then patients can get on there and find out what other doctors are going to cover when somebody is away and so on and so forth. So that again is an example of taking some time and putting a little bit of money into developing a more responsive system.
  
  • It is difficult to get practitioners together in person. Online access is useful for primary care team meetings.
  
  • Front line staff manually record information from electronic devices to turn around and re-enter it into computers. This sort of practice is time-consuming and wasteful. These should be automated. This would also improve cost accounting capabilities and improve our ability to compare practices between hospitals and regions.

**Ideas and Suggestions**

**Service Delivery**

**Administrative Efficiencies**

• Ideas about service delivery:
  
  • Look at e-health options as a way of keeping people out of hospitals.
  
  • Invest in robotic nurses.
  
  • Align e-health strategies with chronic disease management, tele-health and web technology.
· We need a user-friendly electronic navigation system to guide patients through their journey in the health care system.

· Increase e-health initiatives.

· Use technology: have doctors using palm pilots to update records and connect with roving health care teams. Restaurants do it to communicate between kitchens and servers, why not health care?

· Use tele-health to bring specialist care to rural and remote communities and to transfer innovative practices.

· Increase the capacity of NurseLine.

· There should be in-home equipment with information transmitted electronically or by phone to physicians or telephone help lines.

· We need a 211 service to access all community and health resources.

· Use alternative technology approaches for service delivery.

· Develop HealthQuest, an online health care information and service delivery interactive site which would be the responsibility of the Ministry of Health. The site would need to be maintained and updated regularly and would provide links to community information and resources based on the inquirer’s area of interest. The site would also be able to link inquirers to help lines when necessary. Health Quest is a one stop web model of health care delivery that addresses the complexity of the system. It would result in improved management of illness, anticipate needs and prevent crises. It would consolidate information and be based on sound principles and evidence-based practices. Physicians will know it is reliable. The site would encourage self-care and provide the patient with more control over their own care.

· Use technologies to allow for long distance diagnosis and treatment.

· Put a direct line in emergency rooms to the NurseLine so those waiting can call that number to get more information on their condition, and perhaps even be directed to another facility or service.

· The International Normalized Ratio testing should be revisited despite turf war issues.

· Patients should be offered the alternative of communicating by telephone and (secure) email instead of office visits. Either patients or clinical providers might initiate health care interactions using these methods.

· Specialists should be set up in the hospital for video conferencing so that patients do not have to travel so much. Technology could help cut costs here.
• Develop a chat-line. It would be a great way for patients and caregivers alike to learn from each other and feel a part of the group with ongoing care and support.

• Implement a mobile public health van. There could be a computer in the van to look up an individual’s health issues and inform the person to whom they should be directed.

• **Ideas about administrative efficiencies:**
  
  • Create an urbandoc.net online resource for patients to see if their doctor is backed up.
  
  • Install computers in pharmacies, libraries, and seniors centres.
  
  • There should be telephone and video conferencing to support rural areas.
  
  • Through technology such as hand-held computers connected to a wireless network, nurses could cut down the amount of time consumed with paper work and have more time to spend with patients. The initial costs of such technology would be recouped through efficiencies and would result in better patient care.
  
  • Create an electronic drug recording system. As the only province in Canada to have an electronic drug system available to pharmacists, physicians and clinicians, there is a unique opportunity to work together to support seniors and their caregivers. By extending the availability of the electronic drug recording system to caregivers, through the Victorian Order of Nurses (VON) Canada Caregiver Portal, polypharmacy, adverse side effects and reactions to drugs would be reduced, thereby improving client safety and reducing costs to the health care system by reduced visits to emergency rooms and doctor’s offices.

**PharmaNet and Technology**

**Comments and Concerns**

• When you talk about Pharmanet, our general practitioners can read it, but they do not have access to go in and do anything with it, so it is not a really helpful tool.

• The electronic tracking of medications is one way to better manage health care.

• We have copious evidence of poor prescribing in Canada. One obvious solution is to have electronic prescribing assisted by decision support software. Canada has the lowest uptake of any Organization of Economic Cooperation and Development (OECD) country in terms of medical technology and medical practice, and we are paying a price for it.
• Provincial computer records (Pharmanet) allow for pharmacists to have a consistent and good record of pharmaceutical usage.

**Ideas and Suggestions**

• E-prescribing is becoming a reality.

• We need the digital infrastructure to link into e-records and e-prescriptions.

• Who is going to do the monitoring? The monitoring comes out of PharmaNet. The data are there. So it really is a matter of mandating some part of that organization or some separate organization, because you should not always monitor yourself. It should be some separate organization whose job it is to find out how much impact it is having.

• Pharmacies are linked through PharmaNet to prevent drug overuse or misuse.